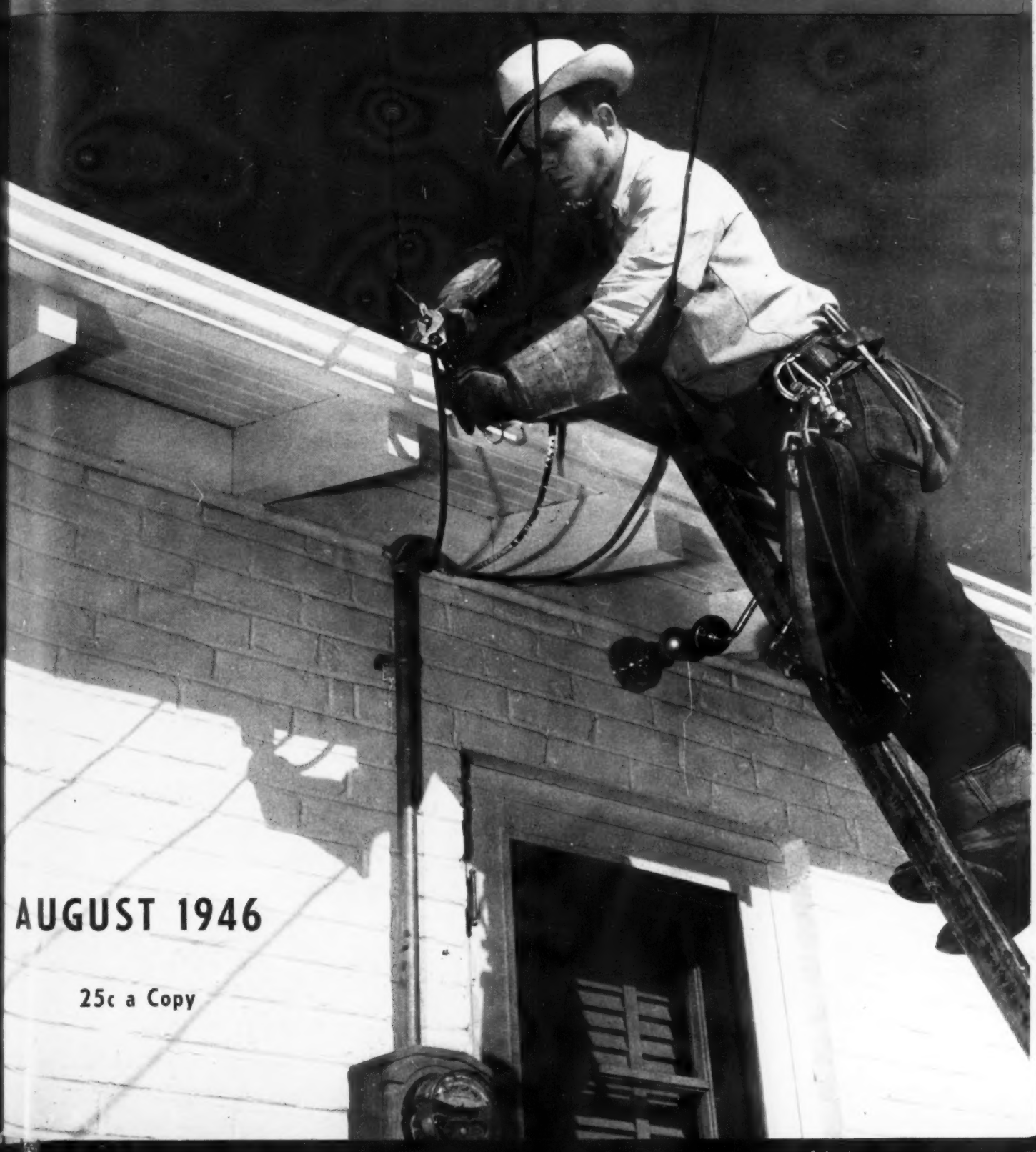
ELECTRICAL WEST

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED SECTION OF THE U. S.



AUGUST 1946

25c a Copy

This model electric kitchen was designed and built by the Edison Company's display department.

To help more Southern and Central Californians "live electrically and enjoy the difference," the Edison Company now has an Electric Home Planning Department. This department helps contractors, architects, and builders who are planning new homes or are modernizing wiring systems in existing homes. Without charge, it develops modern electric kitchen plans and specifications and, when desired, makes perspective drawings which enable the housewife to better visualize her kitchen as it will look when completed.

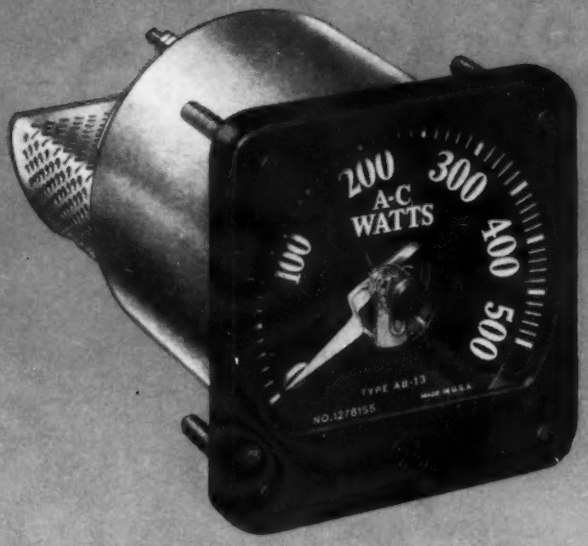
Located in the general office, Los Angeles, the Home Planning Department also serves Edison's district Adequate Wiring Advisors.

SOUTHERN CALIFORNIA EDISON COMPANY

ELECTRICAL WEST (with which is consolidated The Journal of Electricity), August, 1946, Vol. 97, No. 2. Published monthly by the McGraw-Hill Company of California, 68 Post Street, San Francisco 4, Calif. Entered as second class matter at the post office at San Francisco under the Act of March 3, 1879. Additional entry as second class matter at the post office at Los Angeles. Printed in U. S. A. Subscription rates—U. S., U. S. Possessions and Latin American Republics: $2, 1 year; $3, 2 years; $4, 3 years. Canada: $2.50, 1 year; $4, 2 years; $5, 3 years. Other countries: $3, 1 year; $5, 2 years; $6, 3 years. Single copy, 25c. Copyright, 1946. McGraw-Hill Company of California. All rights reserved.

Now Available

for YOUR switchboards



TYPES

AB-13—A-C

DB-13—D-C

VOLTMETERS
A-C & D-C

AMMETERS
A-C & D-C

WATTMETERS

VARMETERS

POWER-FACTOR
METERS

SYNCHROSCOPES

FREQUENCY
METERS

ALSO

Temperature
Meters

Tachometers

LONG SCALE • EASY TO READ • SMALL SIZE • 1% ACCURACY

CONCENTRIC-SCALE instruments

Return with a great war record

Shortly before the war began, production of these instruments had just started. Radically new then—in terms of unusual readability for their small size—they were standardized on Navy installations and served successfully under more severe operating conditions than ever would be encountered in peacetime applications.

Only 4¼ inches square, yet having a scale 7 inches long, these instruments are ideal for large switchgear—they permit packing a lot of circuit information into a small space. They are well suited for console-type equipment where space is at a premium. In fact, they will serve well in practically any permanent or portable installation.

What's more, concentric-scale instruments are unusually sturdy, accurate to within 1 per cent, thoroughly shielded, and have many other excellent features to be found in Bulletin GEA-3432. For your copy, call the nearest G-E sales office. And when you write up your new specifications, call for concentric-scale switchboard instruments. *Apparatus Department, General Electric Company, Schenectady 5, N. Y.*

HEADQUARTERS FOR MEASUREMENTS

GENERAL ELECTRIC

902-95-8200

ELECTRICAL WEST

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Cover Photo: Typifying the public interest today in new homes is this picture from "LINES," Public Service Co. of Colorado publication.

CHANGE OF ADDRESS

Circulation Manager,
Electrical West,
68 Post St.
San Francisco, Calif.

Please change my address

From .....

To .....

Signed .....

People

Earl T. Meldrim

describes for engineers an interesting transformer rebuild job (page 69). He started out from Bratt Institute in Brooklyn, got into the electrical field first with General Electric and the New York Central. He's been with PG and E since 1923, working up first through the division operating group, then going over to the substation department in the East Bay where he's now superintendent of substations. No news to radio hams or AIEE members are his activities in these brotherhoods.

Preview

Lighting

will get special attention in September ELECTRICAL WEST with an array of pages which should serve lighting men well. These will be called the West Coast Lighting Exposition and will exhibit the latest in lighting products together with information as to where they are available in the West. Here, lighting men who have been unable to visit the Eastern expositions will be able to see arranged in orderly style the equipment they need to work with, to design, and to sell.

In the engineering section will appear details on the use of airplanes for power line patrolling. Developed by Montana Power, the technique has carried to utility operations many of the advantages of speed and flexibility which air reconnaissance so abundantly demonstrated for military operations during the war.

First appliance to show a need for selling again is the water heater and some quantities of them are now being produced. Therefore the Sales Guide next month will swing from policy subjects into selling helps, and the first will be water heating. Events of importance and method value in the fast moving sales field will be reported, particularly the big Fall Market.

WHY IT WILL PAY YOU TO MODERNIZE *NOW..*

with new ROEBLING Power Cables

There's stepped-up efficiency in these 4 advantages...

Now—by retiring old, obsolete cables in favor of modern Roebling Power Cables—you can again realize important operating economies:

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Whether you're modernizing your systems or extending your lines into new areas, Roebling Cables fit equally well into the picture... with their correctly engineered dependability, long service life.

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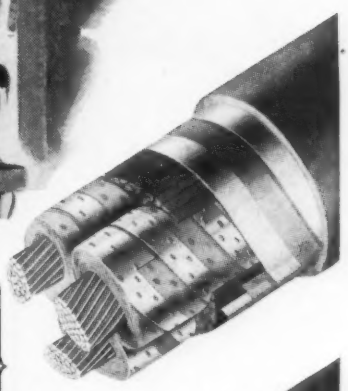
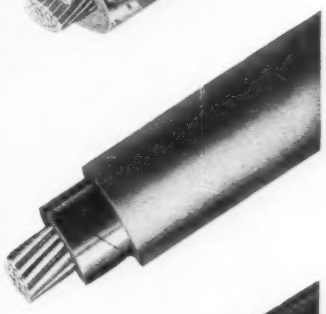


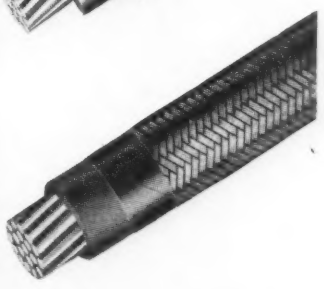
ROEBLING PAPER INSULATED; SHIELDED (TYPE H) CABLE

A "solid" type cable used mainly for underground transmission, distribution or service circuits—particularly for 3-phase grounded neutral circuits at from 13 to 33 kv.



ROEBLING VARNISHED CAMBRIC INSULATED CABLE

For power, heat or lighting circuits in central and sub-stations, mines and plants... for generator and motor leads, transformer, and oil switch leads... to operate at voltages up to 26,000.



ROEBLING RUBBER INSULATED POWER CABLE

Designed for operation up to 15,000 volts in power and light circuits and as apparatus leads. Made in moisture-resistant, flame retardant, weather-proof, oil-resisting and other special finishes.

ROEBLING

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Leader "Officer" fixtures are available for individual mounting or in continuous runs. Optionally, they may be attached direct to the ceiling or suspended. For fluorescent lighting at its best, get the best. Get "Officers" by Leader.

Only better wholesalers carry Leader fluorescent luminaires. Consult the Leader representative in your area, today. He'll gladly give you any desired information.

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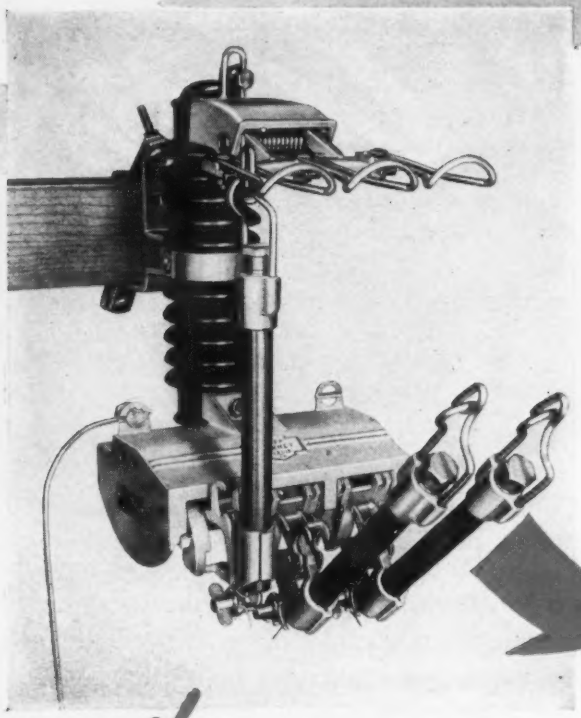
Less Maintenance Tomorrow

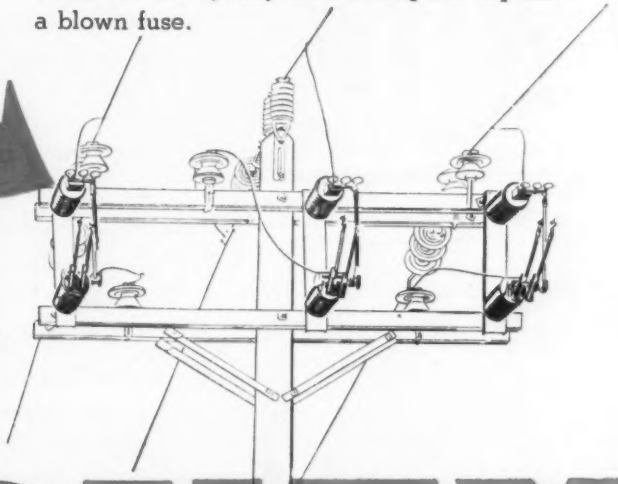
Reduce Service Interruptions and Emergency Service Trips with

KEARNEY TRIPSAVERS



CONTINUOUS SEQUENCE OF ACTION—Keeps reserve fuses always ready for action. Resetting is automatic, the mechanism must be cocked before the cartridge can be replaced. Cartridges go into service in 1, 2, 3 order and repeat continuously without resetting.

Blown fuses are clearly visible from the ground—and are quickly and easily replaced on the next inspection trip. With Kearney Tripsavers you can reduce losses due to unnecessary service interruptions and save countless emergency service trips to replace a blown fuse.



Specify

• *Kearney 7500 Volt, 100 Ampere, Tripsaver —Catalog No. 6867-1*

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MAYDWELL & HARTZELL
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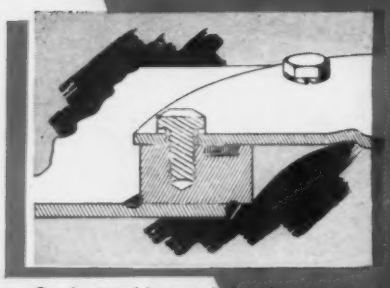
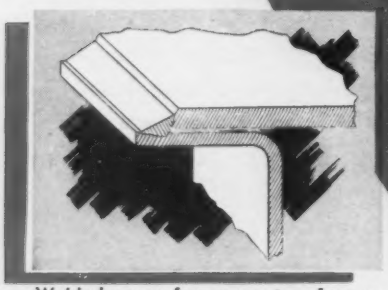
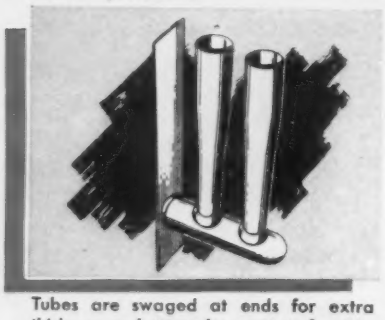
Maintenance Savings Begin with Design of the *tank* *of a G-E TRANSFORMER*



Synthetic rubber gaskets, plus metal-to-metal bolting gives weatherproof, liquid-tight joint on transformers rated above 2000 kva.



Welded cover for power transformers of 501 to 2000 kva provides "factory-sealed" protection.

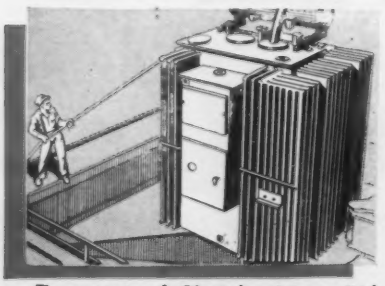


Tubes are swaged at ends for extra thickness and strength at point of welds. This also gives more room for cleaning and inspection.

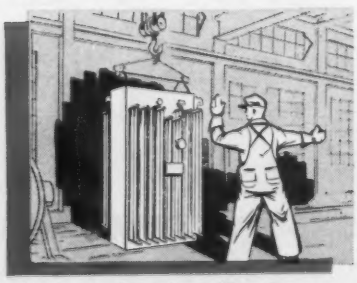
Larger tanks have detachable radiators. Radiator valves permit removal without draining the tank.

IN a G-E power transformer tank there is no such thing as a "minor detail." From the laboratory controlled selection of open-hearth steel plate, down to the 3 baked-on coatings of Glyptal paint, these tanks are built to give utmost protection to core and coils—*with a minimum of inspection and maintenance.*

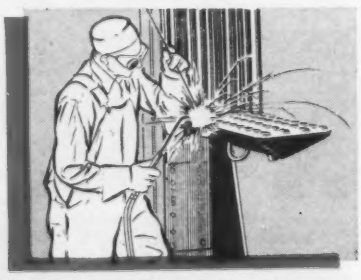
Efficient protection of the insulating liquid from leakage, moisture absorption and oxidation is essential to trouble-free service. In the manufacture and design of G-E tanks, no effort is spared to provide oil tightness and moisture-proof construction. At the same time, all precautions are taken to assure that the unit will retain these maintenance-reducing qualities through many years of service under all weather conditions. Advanced welding methods, pressure-



Three coats of Glyptal paint, applied on a clean, smooth, shot-blasted surface offer maximum resistance to weather.



Cover can be taken off and core and coils removed without completely draining tank.



Radiators are fabricated and thoroughly tested prior to their installation on the transformer tank.

These G-E tank-construction features keep maintenance costs low

1. Conveniently located filter press connections and oil sampling valve enable easy testing and conditioning of oil.
2. Welds which hold liquid are made externally for accessibility.
3. Tubes are braced against vibration.
4. Glyptal paint, applied over clean, shot-blasted surface inhibits corrosion.
5. Tubes are sturdy, swaged at ends to increase thickness at point of welding, and to reduce strains.
6. Tank is open-hearth steel, checked for carbon content to insure good welding qualities.
7. Properly compressed synthetic rubber gaskets or non-porous welds seal all tank joints.
8. Tube and header construction contributes to oil tightness by radically reducing the number of openings in the tank wall.

The tank is an integral part of a G-E transformer. Strength, shape of housing, liquid tightness, resistance to weather have all been considered. The result is a tank that is **durable**; that requires only a **minimum** of maintenance throughout the life of the transformer.

sting of welds, the use of synthetic rubber gaskets, uniform ow-painting—all are major factors in the construction of -E tanks.

This detailed forethought in the design of the tank typifies e design of every element of a G-E transformer. First-hand xperience with field maintenance conditions, an outstanding owledge of electrical design, and testing with the most up--date facilities have anticipated every feature that will cut rvice costs and keep your transformer in continuous, efficient peration.

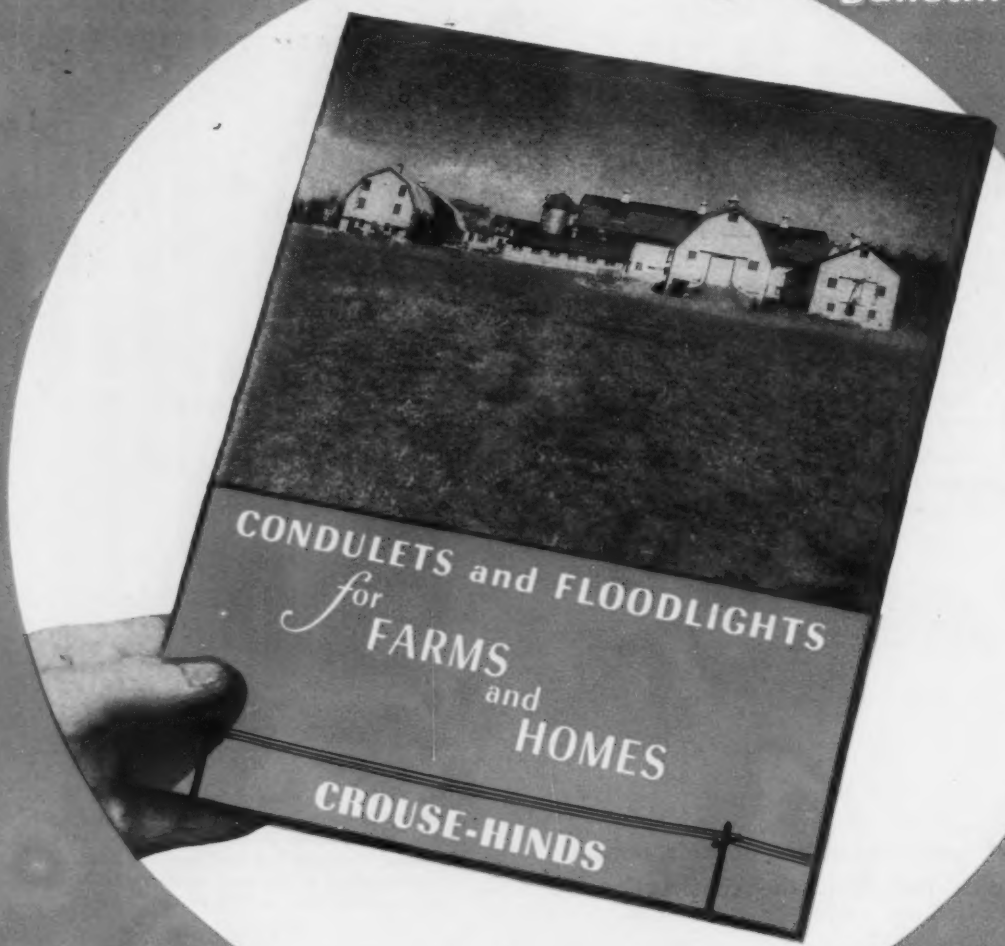
If you are in the process of selecting a transformer, look r these features that will result in tangible savings in instal-tion and maintenance costs. For information call your nearest -E representative, or write to *Apparatus Dept., General ectric Company, Schenectady 5, N. Y.*

POWER TRANSFORMERS

GENERAL ELECTRIC

401-32-5155

CROUSE-HINDS *New* Bulletin 2592...



. . . . will be a big help on your RURAL ELECTRIFICATION jobs

It contains approved service entrance drawings and actual photographs of rural installations, together with listings of hundreds of types and sizes of Crouse-Hinds CONDULETS, GROUNDULETS, Lighting Fixtures, and Floodlights. By using this sturdy cast-metal equipment you can put in safe, long-lasting installations that build good will and enhance your reputation for quality workmanship.

Write for your copy of Bulletin 2592.

Type F Service Entrance Cap for Conduit

Type FBM Service Entrance Cap

Type LB Service Entrance Elbow

Type FBA End Fitting

Type CGY Service Entrance Connector for Cable

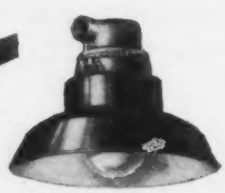
Type FEE Service Entrance Cap for Cable

Type GCH Groundulet

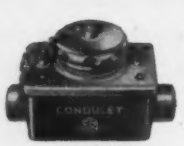
Type GC Grounding Strap

Type GC Bushing

Type GC Strap Clamp


Type V Vaportight Lighting Fixture with Reflector

Type MDB Floodlight


Type FSC Weathertight Plug Receptacle Condulet

Type FS Weathertight Switch Condulet

Type VRE Weathertight Lighting Condulet

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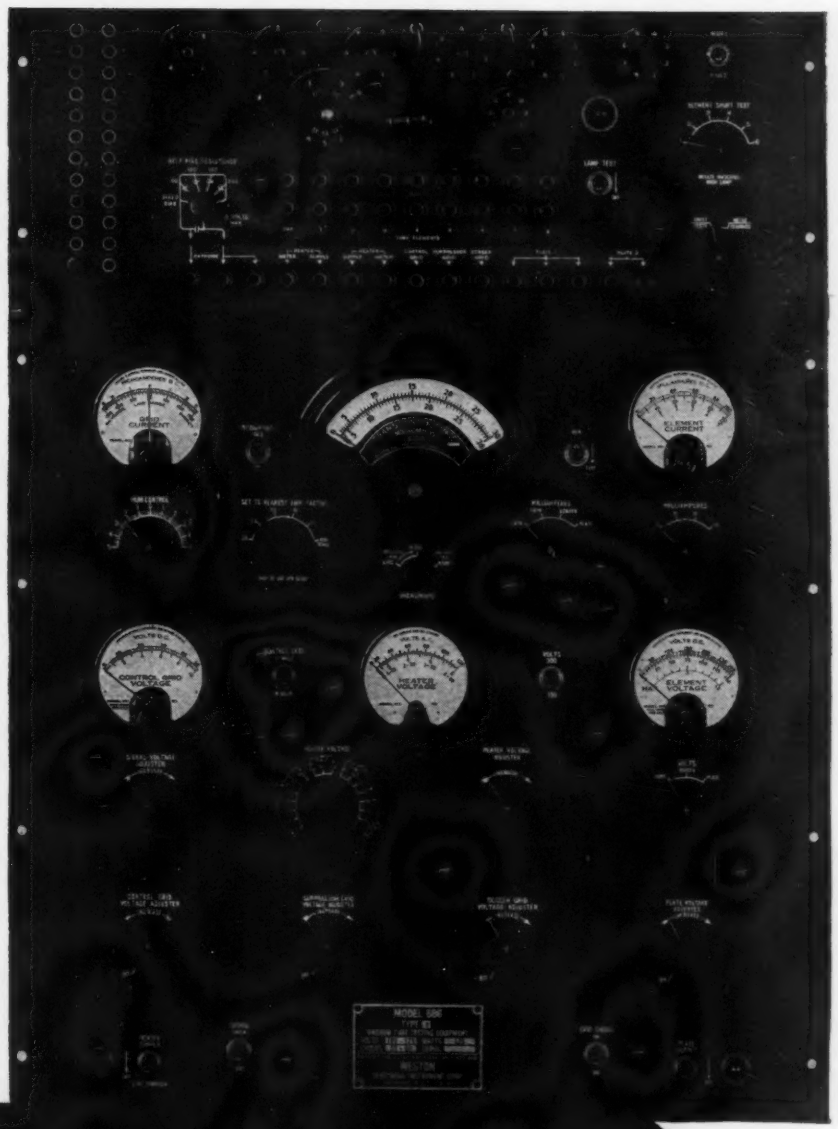

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Gm Range	0 to 3000/6000/15000 Micromhos
Filament Potentials	1.0 to 117 Volts AC
Plate Potentials	0 to 150, 0 to 300 Volts DC
Screen Potentials	0 to 150, 0 to 300 Volts DC
Suppressor, etc. Potentials	0 to 150, 0 to 300 Volts DC
Control Grid Potentials	0 to 10, 0 to 50 Volts DC
Plate Current	0 to 5/10/50/100 Ma. DC
Screen Current	0 to 5/10/50/100 Ma. DC
Suppressor Current	0 to 5/10/50/100 Ma. DC
Cathode Current	0 to 5/10/50/100 Ma. DC
Control Grid Current	15-0-15 and 1500-0-1500 Microamperes DC
Signal Voltage	0.2/0.5/1 Volt AC
Self Bias	50/100/150/200 ohm bypassed by 1000 mfd

Extremely flexible, with virtually no obsolescence factor, Model 686 is essential for laboratory and production analysis, as well as for educational use. Full details from your nearest WESTON representative, or direct. Weston Electrical Instrument Corp., 577 Frelinghuysen Avenue, Newark 5, N. J.

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A Quick One...(1.) Two...(2.)

BREAKS A LOADED CIRCUIT IN THE LCB INTERRUPTER SWITCH

There's no arcing on main contacts of the Westinghouse Interrupter Switch because the circuit is interrupted by the "quick-break" blade. This, plus "De-ion" arc quenching, results in an economical switch that can be opened whether the circuit is dead . . . energized . . . or loaded.

The LCB Interrupter Switch is the modern answer for safe, nonautomatic switching. It's used to sectionalize primary feeders, isolate transformer banks, capacitors and voltage regulators.

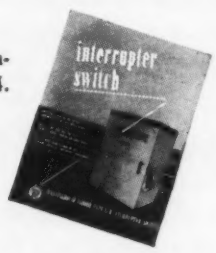
LCB Switches are group operated, designed for indoor installation, and suitable enclosures are available to meet every requirement. When installed with the Type BA power fuse in series, the combination furnishes short-circuit protection in addition to load-interrupting ability.

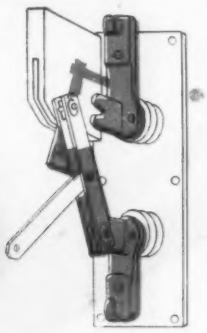
Call your Westinghouse office for complete information, or write for Booklet B-3754. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. J-60639

Westinghouse
PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

INTERRUPTER SWITCHES

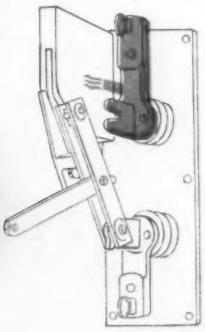
Ask your Westinghouse Distributor or write for Booket B-3754.



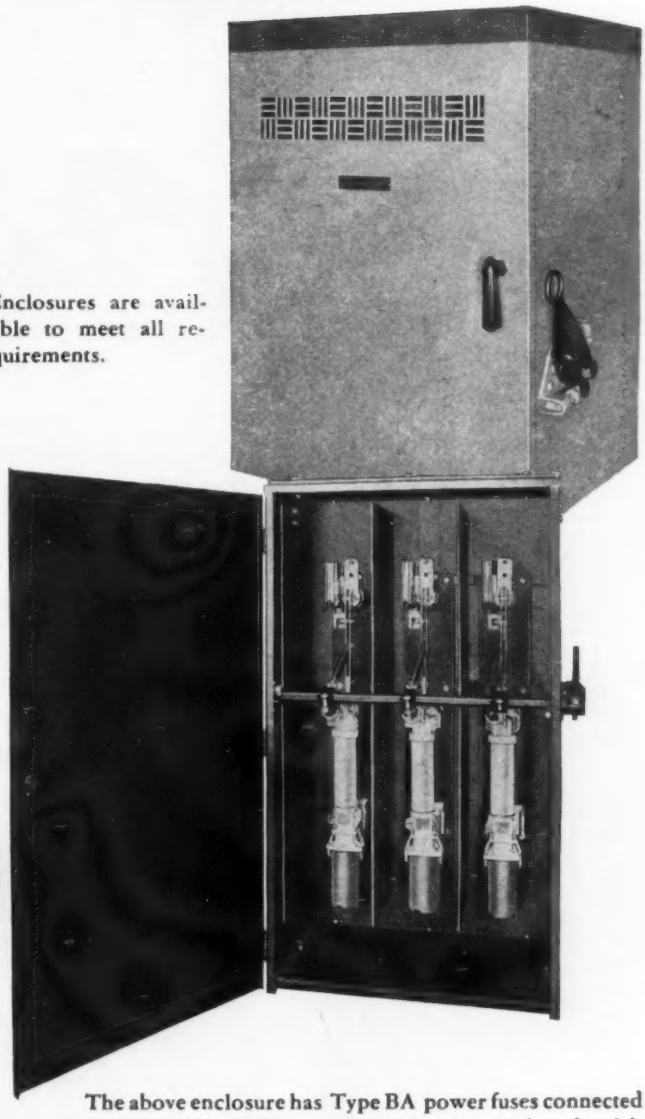


1. When main blade opens, all current momentarily passes through "quick-break" blade.

2. "Quick-break" blade stretches arc in "De-ion" arc chamber where it is quenched instantly.



Enclosures are available to meet all requirements.



The above enclosure has Type BA power fuses connected in series with the Type LCB multi-pole switch to furnish high-capacity, short-circuit protection.

ITS PROTECTION is more than skin deep

...it's Copperweld!

Only Copperweld-Copper gives you all these advantages

1. HIGH STRENGTH
2. RUGGEDNESS
3. HIGH CONDUCTIVITY
4. VIBRATION-REDUCING DESIGN
5. PROTECTION AGAINST RUST
6. HIGH MELTING POINT
7. EASY HANDLING
8. LOW OVERALL COST

Copperweld is the only wire made by the proved MOLTEN-WELDING process

Copperweld wire does not depend for protection upon a thin deposit that temporarily coats the steel core, but upon a thick covering of copper, the molecules of which are permanently welded to those of the alloy steel by the exclusive Copperweld molten-welding process. The cut-away section above illustrates this point.

In addition to life-long protection against corrosion, Copperweld gives you excellent conductivity plus that high degree of strength necessary for long span construction and the ruggedness needed to withstand winds, ice and falling trees.

Yes—the protection afforded by Copperweld is "more than skin deep"— it really lasts! So, wherever you need an overhead conductor with the conductivity and rust-resistance of copper plus the rugged strength of steel, play safe—install Copperweld-Copper. Remember that Copperweld products have been successfully serving industry for more than thirty years.

Engineering data sent on request.

COPPERWELD STEEL COMPANY

GLASSPORT, PA. ***Sales Offices in Principal Cities***

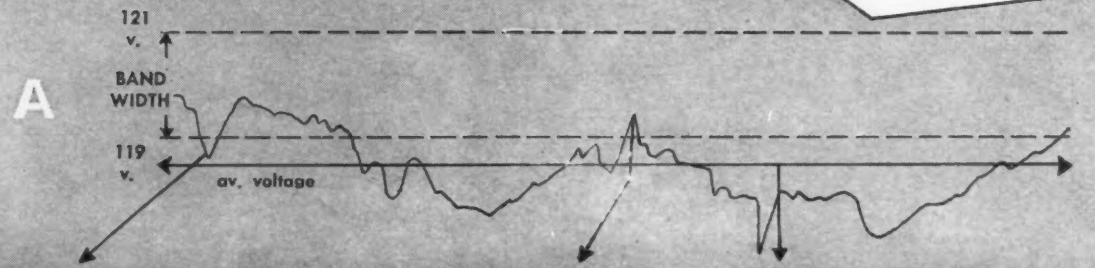
Pacific Coast Office: Rialto Building, San Francisco, California

Improve Line Regulation

WITH ALLIS-CHALMERS 5/8 % STEP REGULATORS EMPLOYING VOLTAGE INTEGRATION

HERE'S THE DIFFERENCE . . .

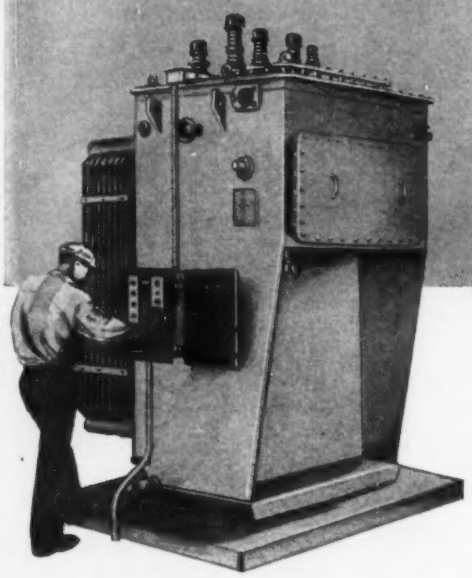
between regulator *without* time delay — regulator *with* time delay — and Allis-Chalmers regulator *with voltage integration*, in the correction of a fluctuating line voltage condition.

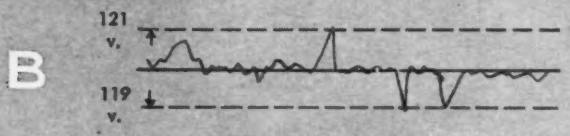


REGULATOR WITHOUT TIME DELAY changes taps *each time* that voltage falls below band setting, even for momentary dip. Since no feeder voltage regulator can *prevent* such dips, correction without time delay only makes fluctuations more apparent by doubling their number.

REGULATOR WITH TIME DELAY — whenever voltage returns to normal, even for an instant, full time delay goes into effect. Voltage must then be out of band *continuously* for full time delay period, before taps can be changed. Thus abnormal voltages can persist for long periods.

REGULATOR WITH INTEGRATION of voltage sums up and averages all voltage fluctuations which occur on the line, allowing taps to be changed when average voltage is too high or too low. Allis-Chalmers regulators, with integration, thus give more stable line voltage.





WITH ALLIS-CHALMERS REGULATOR ON THE LINE

CHART "B" illustrates how "voltage integration" keeps average voltage at desired level at all times, correcting condition shown in Chart "A", where average voltage is outside of band.

YOU GET CLOSE regulation (± ¾ volt) with A-C's voltage integration feature combined with "Feather-Touch" control—and famous "Quick-Break" tap-changing mechanism means longest contact life! For a complete description of Allis-Chalmers 5/8% Step Regulators for all feeder voltages, see our nearby sales office, or write ALLIS-CHALMERS, MILWAUKEE 1, WISCONSIN.

A-2059

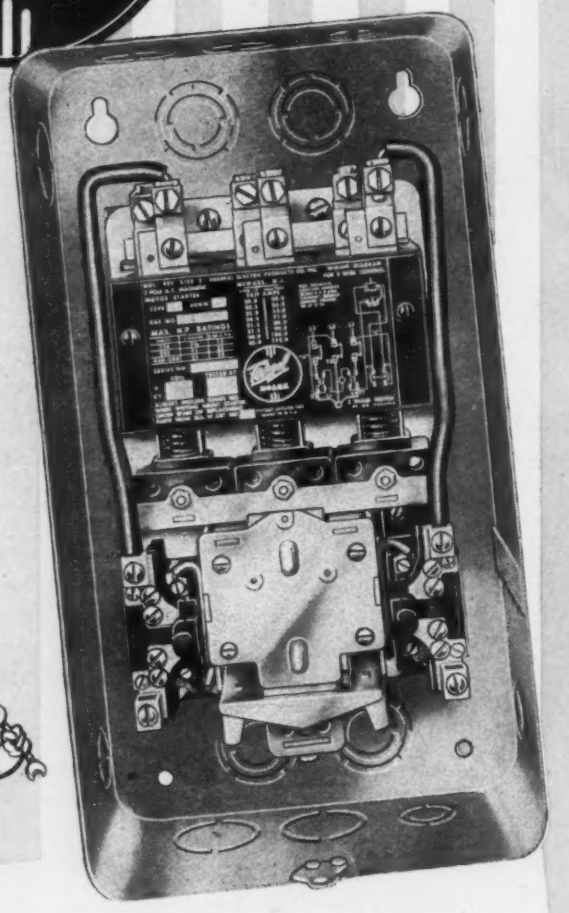
ALLIS-CHALMERS

One of the Big 3 in Electric Power Equipment — Biggest of All in Range of Industrial Products

5/8% STEP REGULATORS

Federal
NOARK

SIZE 3
MAGNETIC
MOTOR STARTER



For man-size jobs of stop-and-go
Without a bit of care or woe
This starter really fills the bill . . .
A fine example of Federal's skill!

Sets a new standard of ease and speed in replacement of any stationary or moveable contacts. Coil replacement in a few seconds without disturbing line or load connections. Greater compactness, yet more ample wiring space. Silver contacts on all current interrupting points. Exclusive vertical ball-bearing operation for highest speed solenoid action. Overload relays, combination hand or automatic reset, for dependable protection.

FEDERAL ELECTRIC PRODUCTS COMPANY, INC.
EXECUTIVE OFFICES: 50 PARIS ST., NEWARK 5, N. J. PLANTS: HARTFORD, CONN. NEWARK, N. J.

BOOKS

you may want

ELECTRIC PROTECTIVE EQUIPMENT AND POWER FACTOR CORRECTION, by Edwin S. Lincoln, published by Essential Books, New York, in its Modern Electrical Series.

Primarily this volume covers the protection of plant electrical circuits from overloads, reverse currents, under and over voltage by means of fuses and circuit breakers. Electrical characteristics of fuses and circuit breakers are described and illustrated by means of curves and their mechanical construction discussed and illustrated. Requirements of the National Electric Code for feeder and branch circuit protection are outlined in detail and tables of conductor sizes and overcurrent protection for motors are included. Valuable suggestions for circuit breaker inspection and maintenance are given. A section is included on fire protection and fire fighting equipment for electrical systems. Power factor correction methods are outlined and power cost and equipment saving through such improvement are treated in several examples. Power factors of various industrial plant equipment are tabulated and comparative costs of capacitors for correction are given.

☆

ELECTRIC MOTORS AND GENERATORS AND RELATED DRIVES, by Edwin S. Lincoln, published by Essential Books, New York, in its Modern Electrical Series.

Written for the practical plant electrical man, this book is packed with valuable data on the characteristics and applications of motors and generators. The physical character and construction of machines for various services are fully described and illustrated. Ratings, service factors and operating factors at various loads are thoroughly discussed and complete tables showing speeds, efficiency, power factors and full load currents are included. Types of motors especially adapted for given duties are listed and torque requirements for various driven machines are discussed and tabulated. All types of industrial motors both a-c and d-c are described and compared and valuable hints on installation, inspection and maintenance are included. Motor-generator and engine-driven emergency generator sets are described and illustrated and their uses outlined. An entire section is devoted to mechanical drives with suggestions on the procedure involved in efficient drive design. Belt, chain and gear drives are discussed in detail and a large amount of design data included. The uses of various types of variable speed transmissions are described.

☆

A CHRONOLOGICAL HISTORY OF ELECTRICAL DEVELOPMENT, National Electrical Manufacturers Assn., 155 E. 44th St., N. Y., 106 pages, $2.

Designed as a reference work, this book tells the story of electricity from its discovery in 600 B.C., names the men identified with it and lists the equipment built to utilize it. Although modern electrical applications are touched on, emphasis is on the early-day men of science and industry and what they did to further electrical living. Information is given on electrical expositions and congresses, the birth of electrical publications, engineering and trade associations, societies, foundations and institutes.

THESE FACTS SHOW *Why* . . .

G-E *Thermoplastic* BUILDING WIRE

answers your wiring needs

New Wiring · Rewiring
Maintenance Wiring

Description . . . G-E thermoplastic building wire (Types T and TW) is a small diameter wire made of highest quality materials and produced to meet rigid specifications. It can be used for all wiring requirements where permitted by local codes and is suited for widely varying service conditions.

Physical Properties . . . G-E thermoplastic building wire resists oils, acids, alkalies, and other chemicals and solvents. It is virtually unaffected by sunlight, moisture and weathering. It resists flame and will not support combustion.

Electrical . . . G-E thermoplastic building wire is high in dielectric strength and will withstand a 720-volt per mil breakdown voltage. Current carrying capacity ranges from 18 amperes for size 14, to 455 amperes for 1000000 CM (based on National Electric Code). High insulation resistance eliminates the danger of loss of power due to current leakage. Types T and TW wires can be used wherever Types R, RL, and RW are acceptable.

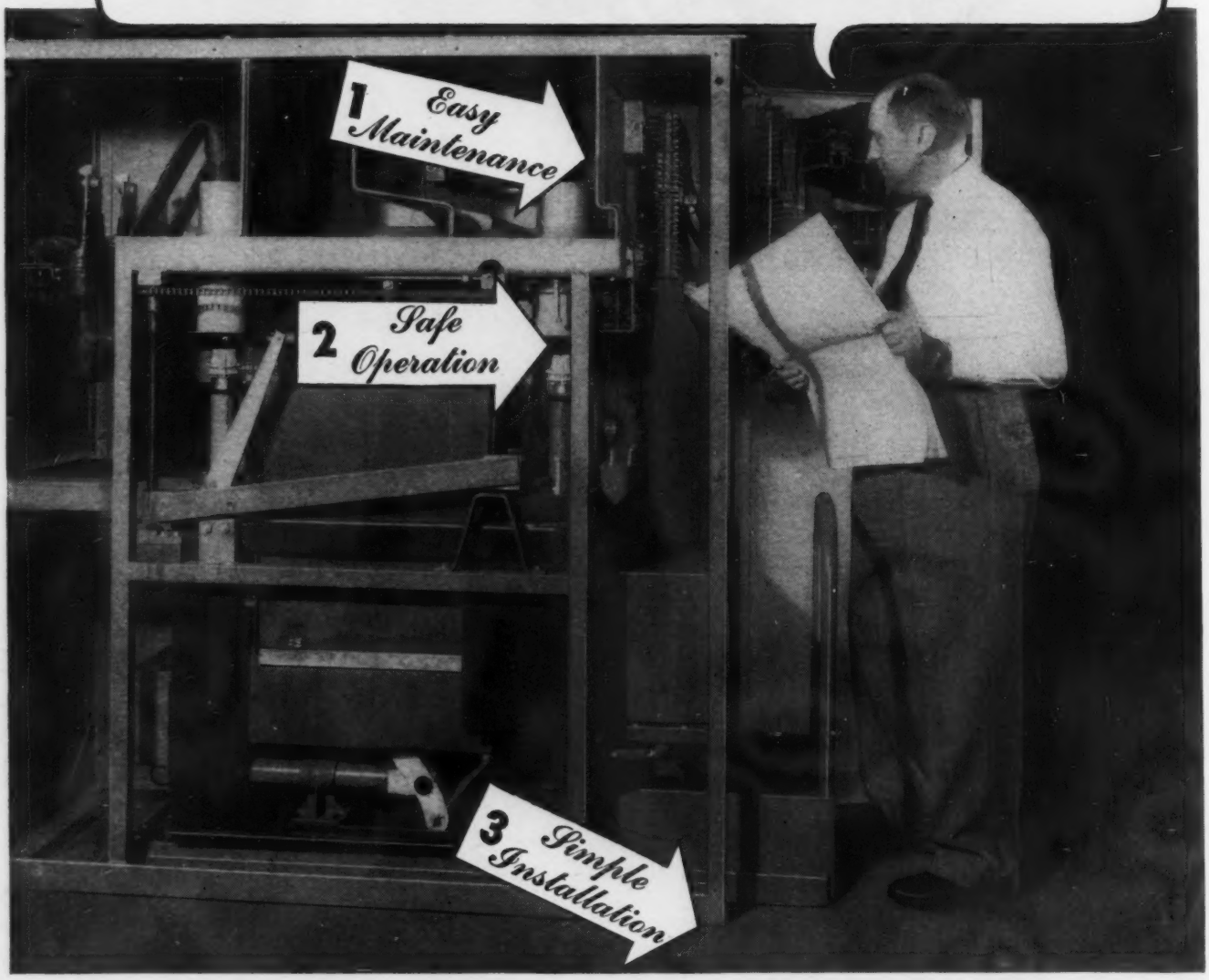
Insulation . . . G-E thermoplastic building wire is insulated with plasticized polyvinyl chloride compounds which give it unusual resistance to aging, abrasion, and extremes of temperature. The insulation has a hard, smooth finish.

Types . . . Types T and TW building wires are suitable for new wiring, rewiring, maintenance wiring, and special wiring. Type T is recommended where general-purpose wiring is suitable. Type TW is recommended for service in permanently wet locations.

Information . . . Ask your nearest G-E Merchandise Distributor or write to Section W3-818, for additional data on physical and chemical characteristics, sizes, typical applications, etc. General Electric Company, Appliance and Merchandise Department, Bridgeport, Connecticut.

GENERAL ELECTRIC

"Give Me Metal-Clad Switchgear With These Three Advantages . . "



Yes, Most Operators have Three Chief Requirements for Switchgear, and All Three Needs are Met in Full by Allis-Chalmers Advanced Design

DETAILS which contribute to *easy maintenance* of Allis-Chalmers switchgear units are removable plates for access to instrument compartments, etc; "hinged" wiring connection to eliminate wear or bending on wires when door is opened or closed; and special method of insulating busbars without necessity for using compound-filling for bus joints.

Isolation of units, fully automatic disconnect shutters, and positive interlocks on elevating mechanism are a few of the details adding up to *safety* for operators.

Completely factory-built, wired and assembled, Allis-Chalmers switchgear units are *easy to install.* Simple four-point alignment saves installation time!

Allis-Chalmers metal-clad switchgear is equipped with magnetic air, oil, or air blast circuit breakers. For details, see your nearby A-C office, or write ALLIS-CHALMERS, MILWAUKEE, WIS.

A 2091

ALLIS AC CHALMERS

One of the Big 3 in Electric Power Equipment — Biggest of All in Range of Industrial Products

METAL-CLAD *Switchgear*

"LEAD SITUATION BECOMING PROGRESSIVELY WORSE"

Lead-Covered Cable to Remain in Short Supply

According to a recent report of the Civilian Production Administration "the lead situation is becoming progressively worse . . . it is feared that the inability to obtain lead will result in curtailment of production by lead consuming industries such as the battery, chemicals and cable covering industries."

...but Okonite has time-tried answers

Among today's Okonite-introduced cable developments are, fortunately, a number that do the job of lead-covered cables as well as—and in some cases—better than those long scarce items. Here are several suggestions for removing the handicaps of today's shortages. Among them you may find more than one answer: Write for Bulletins to The Okonite Company, Passaic, N.J.

FOR LOW VOLTAGES (0-5000 volts) . . .
use OKOLITE-OKOPRENE* CABLES

Okolite-insulated conductors are protected by a sheath of Okoprene, an Okonite-designed neoprene compound. No braids to rot or disintegrate. Resist moisture, ozone, sunlight, oil, chemicals and flame. Flexible. Long-lived. Tough air-tight covering provides permanent seal. High surface resistance. Surface discharge eliminated. No lead wipes or potheads. No expert splicers needed. Recommended for apparatus leads, networks, power, light and signal circuits. Millions of feet in service. Bulletin OK-2009-E.

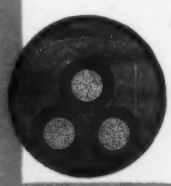
*U.S. Pat. No. 2,312,058

FOR HIGHER VOLTAGES (To 38,000 volts) . . .
use the same OKOLITE INSULATION WITHOUT A LEAD COVERING

with Okoprene or other finishes for direct burial or in ducts. Also for submarine cables and dredge cables, and in other completely-immersed circuits. 20-year service record. Excellent moisture, heat and ozone resistance. Low specific inductive capacity and power factor. Eliminates electrolysis. Simplifies splicing and terminating. Reduces terminating costs. Bulletin OK-2007-D.

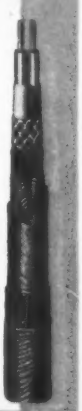
FOR HIGH VOLTAGES (Up To 230,000 volts) . . .
use
OILOSTATIC TRANSMISSION SYSTEMS

with oil-impregnated paper-insulated conductors in welded steel pipe filled with oil under 200 lbs. pressure. Higher dielectric strength. Greater insulation stability. Increased current carrying capacity. Right of way costs radically reduced. Proved in past 14 years. Over 20 separate circuits in operation. Improves property values by eliminating overhead lines. Saves space in generating stations. Bulletin OK-2019-A.



FOR STREET AND AIRPORT LIGHTING, UNDERGROUND BUILDING ENTRANCES . . .
use HAZARD ARMORTITE CABLE

non-metallic underground cable with protective coverings of asphalted jute, leather-like armor tape, plastic sealing compound and rubber-faced tape. Not affected by moisture, acids or alkalies. Introduced in 1928, has served nearly two decades without insulation failure. Can be buried directly in ground. Mechanically strong. Requires no conduit. Bulletin 146.



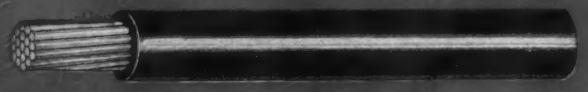
OKONITE SINCE 1878 **insulated wires and cables**

4654

CRESCENT

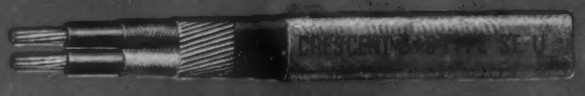
Makes
ALL TYPES OF WIRE & CABLE
Sold by Electrical Wholesalers

CRESCORD . *Jacketed Portable Cord*

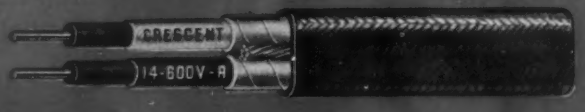


SYNTHOL *Building Wire - Types T&TW*

Rubber Covered Building Wire and Cable



Service Cable - Types SE-U; SE-A; SD



CRESFLEX *Non-Metallic Sheathed Cable*

A B C *Armored Cable*

AND AMONG OTHER TYPES THE FOLLOWING:

Bare Copper Wire & Cable
Brewery Cord
Control Cables
Fire Alarm Cable
Fixture Wires
Flexible Cords
Flexible Steel Conduit
Heater Cord
Neoprene Jacketed Portable Cable
PERMACORD
Power Cables
Shipboard Cable
Signal Cable
Slow-Burning Wire & Cable
Switchboard Wire & Cable
Telephone Wire & Cable
Thermostat Cable
Trench Cable
Varnished Cambric Cable
Weatherproof Wire & Cable
Welding Cable

NEMA

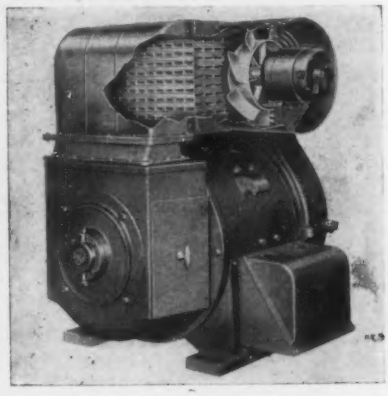
CRESCENT
WIRE AND CABLE
CRESCENT INSULATED WIRE & CABLE CO.
TRENTON, N. J.

PRODUCTS

that are news

D-C Motors (800)

For use where atmospheric conditions are severe, a new line of G-E unit-cooled d-c motors is available in sizes from 15 to 200 hp. at popular speeds and voltages. Totally enclosed construction is made possible by a dual ventilating system, according to the product announcement, which states that this system utilizes a compact unit cooler operating on a principle similar to that of an automobile radiator but using air instead of water for cooling. A thermostatic relay in the airstream of the enclosed system protects the main motor in case of failure of the auxiliary motor power supply or accidental restriction of the air intake. Vital parts are accessible for periodic maintenance. These motors are available with ball or sleeve type bearings. Constant-speed motors are available with shunt, stabilizing shunt or compound windings. Adjustable-speed ratings are shunt or stabilized shunt wound.



Coil Winder Drive (801)

A coil winder drive especially designed for fractional horsepower motor winding has been announced by Ideal Industries. Operation has been simplified to two controls and a clutch in securing a speed variation from 41 to 410 r.p.m. Turns are recorded by an Odometer type counter, which is in full view of the operator. The device is driven by a ½-hp. 1,750-r.p.m. motor through a spur gear drive. Torque is 77 in. lb. at fast speed and 770 in. lb. at slow speed. A floor space of 19x20¾ in. is required. Weight of drive is 250 lb.

Radiation Meter (802)

A portable radiation meter providing a direct indication of radiant-energy intensity is being manufactured by General Electric. It consists of two major parts: a radiation receiver in a metal enclosure on top of the case and a D'arsonval type indicating instrument connected to the receiver output leads.

Cartridge Fuse (803)

A renewable cartridge fuse built on a simplified design has been added to the Royal-Noark line and is available in all sizes from 3 to 600 amp., 250 and 600 volts. Construction is said to make assembly foolproof and to eliminate overheating.

TRUMBULL

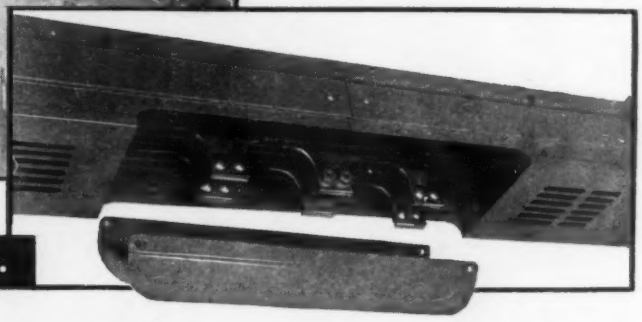
FEEDER DISTRIBUTION SYSTEMS

EASY TO INSTALL

EASY TO SERVICE

EASY TO EXTEND....

"Like a broad and safe Electrical Highway through the plant"



The new improved type connection and cover simplify installation . . . no special tools required. Cover quickly removed for inspection . . . lots of room to work. Now easier than ever to take off taps from L.V.D. Systems.

. . . and easy to get . . . NOW!

If you are an electrical contractor, an architect, utility man, or industrial electrical engineer, here is something really important you can do for your customers or clients. Tell them about Trumbull's COMPLETE modern method and equipment for industrial and commercial power transmission and control . . . about Trumbull L.V.D. Busways for main feeder distribution . . . Flex-A-Power Plug-in Busways and Flex-A-Plugs for branch circuits to load, and Trumbull Control Centers for flexible, complete motor control and feeder circuits. Trumbull pioneered these basic systems. Trumbull engineering has brought them to their present high pitch of efficiency. And Trumbull production makes them available to you NOW in packaged units ready to install and connect.

If you are an industrial plant owner or operator faced with urgent need of procuring electrical power distribution equipment, call the nearest Trumbull Electrical Contractor right away, or write direct to Plainville.

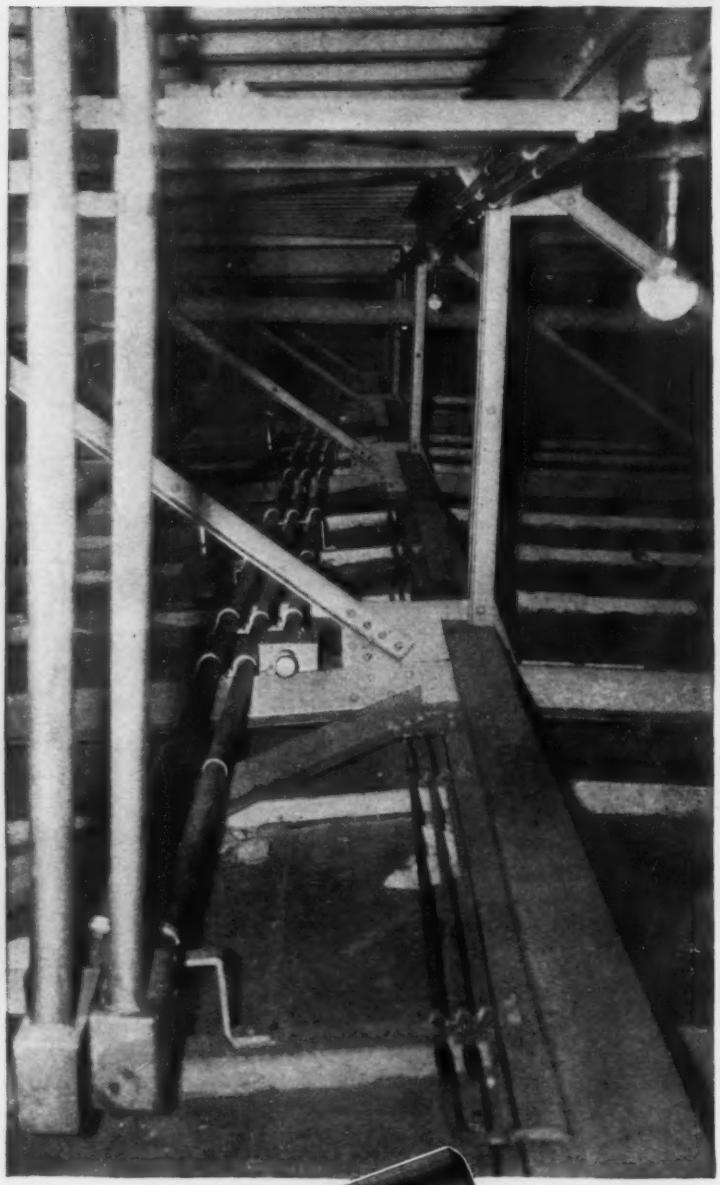
THE TRUMBULL ELECTRIC MANUFACTURING CO.

PLAINVILLE, CONNECTICUT

OTHER FACTORIES AT

NORWOOD, OHIO — LOS ANGELES — SAN FRANCISCO — SEATTLE

FOR SAFETY'S SAKE . . . USE CONDUIT *(Full Weight Rigid Steel)*



SURE PROTECTION

is cheaper than uncertain hazard

IT may be easy to take a chance --especially if wiring is in out of the way places, if it seems to be safe from careless people and tamperers.

But who can figure the cost of the risk--the risk of dust accumulation, moisture and vapors, vibration, intruding animals, birds, insects, possible explosion?

The only inexpensive fire or explosion is the one that is prevented from happening. It is cheaper in the end to be positively safe, to provide dependable protection for electric wiring--just as has been done in the attic space pictured here--for residence or public building, store or factory.

Youngstown "Buckeye" is a standard-threaded, full-weight rigid steel conduit--most widely used conduit in the world. Rigid steel conduit provides the only kind of wiring system that the National Electrical Code approves for hazardous locations and occupancies as being dust, moisture, vapor and explosion proof. Local distributors have "Buckeye" in stock now.

YOUNGSTOWN

THE YOUNGSTOWN SHEET AND TUBE COMPANY

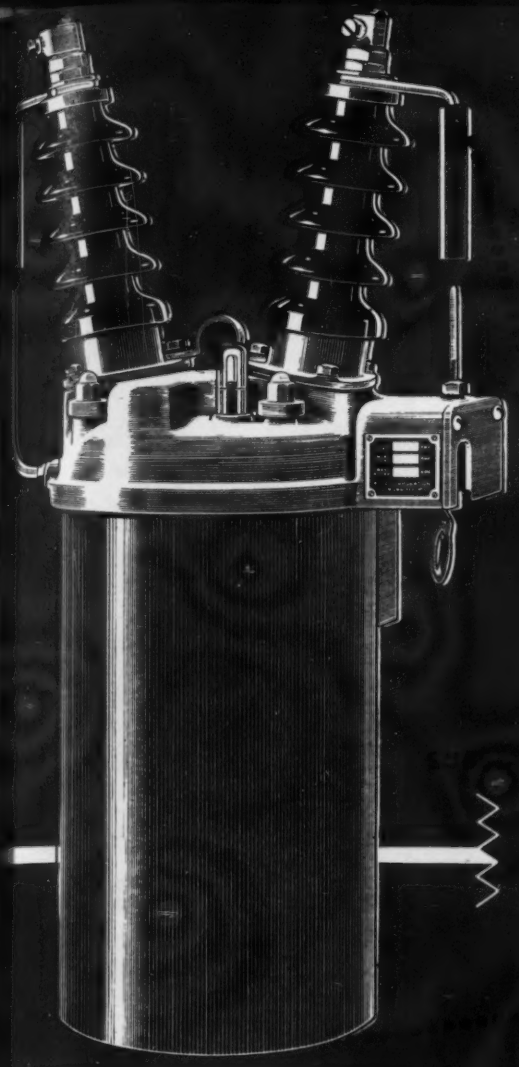
GENERAL OFFICES - YOUNGSTOWN 1, OHIO

Export Offices - 500 Fifth Avenue, New York City

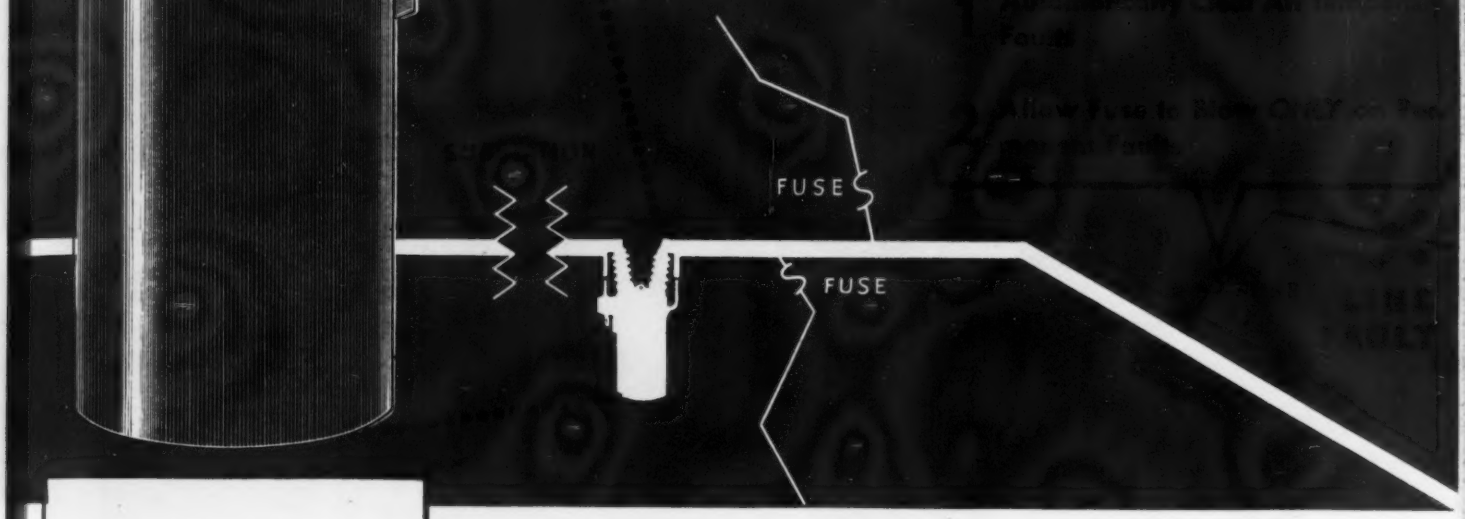
Manufacturers of

CARBON - ALLOY AND YOLOY STEELS

Ask your distributor for:
Youngstown Buckeye Conduit...Pipe and Tubular Products...Sheets...Plates...Electrolytic Tin Plate...Coke Tin Plate...Bars...Rods...Wire...Tie Plates and Spikes.



Only KYLE CIRCUIT RECLOSERS PROTECT THIS SYSTEM TWO WAYS



KYLE FEATURES

Hydraulic Control Mechanism . . . Provides accurate timing on all Recloser Operations.

Double, Fast-Acting Contacts . . . Prevent burning of contact surfaces by high speed action.

Recloser is Triple Safe . . . Operating handle and tank always dead. No terminal in bottom of tank. Normal position of Recloser is open.

Recloser Ratings . . . Voltage: 2400 to 15,000; Ampere Rating: 5 to 50; Minimum Tripping Current: 10 to 100 Amperes; Interrupting Capacity: 150 to 1200 Amperes. Rating changed by replacing series trip coil.

Kyle Type "H" Oil Circuit Reclosers are timed to provide fast opening on the first two operations . . . time-delay opening on the third and fourth operations. The two fast openings automatically clear all temporary line faults, such as those resulting from lightning or falling tree limbs, without damage to branch line fuses.

The time-delay openings of the Kyle Recloser permit the branch line fuse to blow ONLY on permanent faults . . . faults that cannot be cleared by the two fast openings. This isolates the affected branch line and maintains service on the rest of the system.

After opening one, two, or even three times, the Kyle Type "H" Recloser automatically resets for another complete cycle of operations. A permanent fault on the main line will cause the Recloser to lock open after the fourth operation. This TWO-WAY automatic protection, which only Kyle Type "H" Reclosers can offer, results in better continuity of service, more satisfied customers and reduced maintenance cost.

Your Line Material Representative can give you complete information on how you can provide your lines with this Kyle Two-Way Protection.

MADE BY KYLE CORPORATION SOUTH MILWAUKEE WISCONSIN

Collyer A.V.C.

(ASBESTOS VARNISHED CAMBRIC) for Severe Service

RESISTS FLAME, HEAT, FUMES, OILS, GREASE, MOISTURE, ABRASION

600 VOLT A.V.C. STRANDED CONTROL CABLE

600 VOLT A.V.C. POWER CABLE

The same imperishable rock fibre to which many an aircraft fire fighter owes his life protects Collyer A.V.C. Cable under conditions where ordinary insulations fail. Today, newly developed non-toxic resin impregnating compounds and new methods of manufacturing and testing give Collyer A.V.C. Wires and Cables additional assurance of unfailing service under the most difficult operating conditions.

Let us know your requirements.

CONTROL CABLES

Widely used in steel mills, foundries and boiler rooms, this multi-conductor cable assures safe operation of electric cranes, signal apparatus, etc.

POWER CABLES

For continuous operation at high temperatures in power plants, mines, steel mills, etc., under severe conditions. Available in single or multi-conductor for voltages up to 7500.

RHEOSTAT WIRES

All-asbestos construction withstands the high operating temperatures of electric ranges, rheostats and control panels. Furnished with copper, monel or nickel conductors.

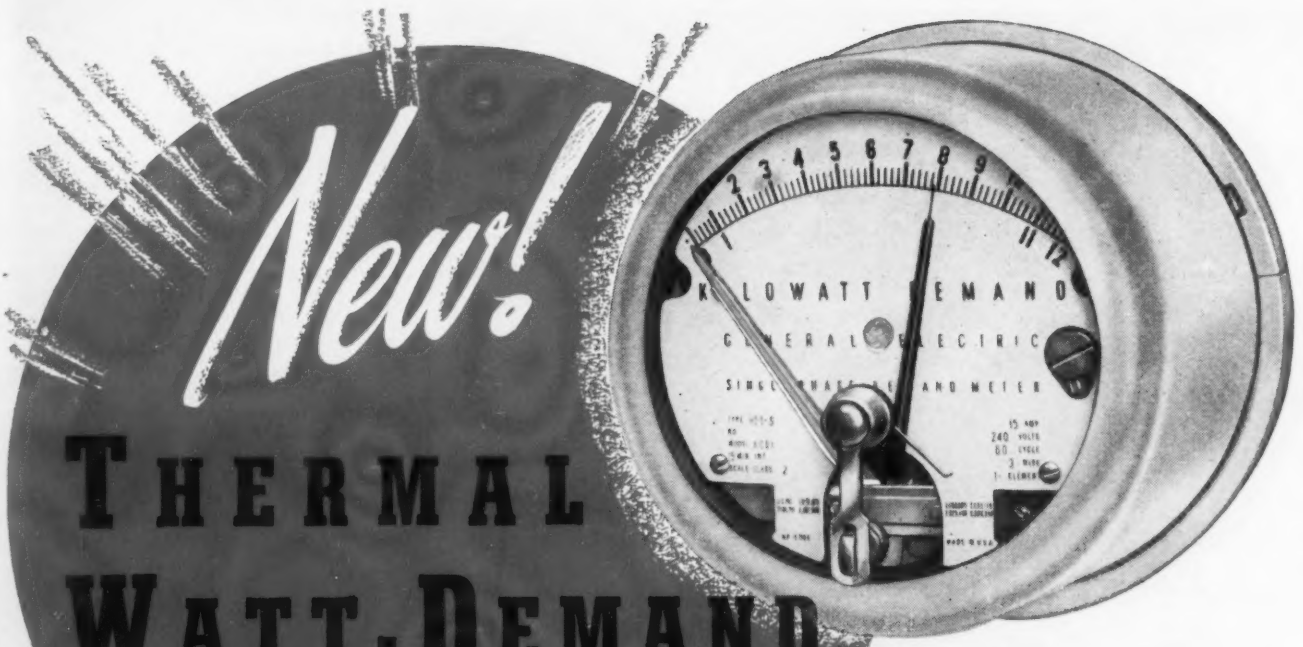
RHEOSTAT WIRE (ALL-ASBESTOS)

Collyer

INSULATED WIRE CO.

Allied Industries Inc.

Los Angeles—San Francisco—Seattle



Based on the *DIRECT-HEAT* Principle

You get three new features of operation with the radically different and unique G-E thermal watt-demand meter because it is built upon the "direct-heat" principle. Unlike meters of conventional design, in the new G-E meter the current passes *directly* through the bi-metallic spirals of the temperature-sensitive unit. Each spiral serves not only as a temperature-sensitive element, but also as its own electrical-resistance heater. There is no separate heating element. This means for you:

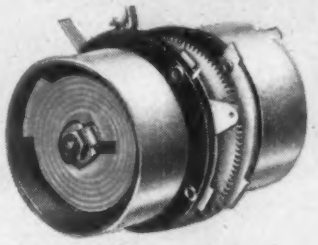
- **High operating torque (2660 gram millimeters)—Because the heat is generated *directly* within the temperature-sensitive bi-metallic spirals, operating torque for the same watt loss is much higher than that obtained in meters of conventional design. This makes possible the use of sturdy parts in the driving mechanism, which in turn assures long-life accuracy, indicating-pointer stability, and low maintenance costs.**

- **Ideal response-time characteristics—The new G-E thermal watt-demand meter, unlike those built with separate resistance elements, follows in operation the ideal exponential curve, which admits of simple definition and easy mathematical analysis.**

- **Accuracy of indication—Pointer overshoot caused by continued transfer of heat from a separate resistance element after the load has been removed is eliminated.**

For complete information on this new development in the art of meter design, write today for "Thermal Watt-demand Meter GEA-4541," Apparatus Department, Schenectady, New York.

- **HIGH OPERATING TORQUE FOR:**
  - **Sturdy parts**
  - **Long-life accuracy**
  - **Indicating-pointer stability**
  - **Low maintenance costs**
- **IDEAL RESPONSE TIME CHARACTERISTICS**
- **ACCURATE INDICATION**



Direct-heat thermal element

THE FIRST IN A FAMILY OF G-E THERMAL DEMAND METERS

HEADQUARTERS FOR MEASUREMENTS

GENERAL ELECTRIC

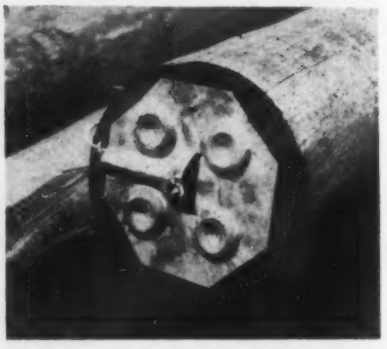
WESTERN MADE
Quality
LIGHTING FIXTURES
The West supports one of America's leading manufacturers of lighting equipment . . . producing quality fixtures bearing a nationally known label. With production concentrated on the Pacific Coast, Smoot-Holman Co. assures western users a dependable source of supply for all types of commercial and industrial incandescent and fluorescent lighting.
SMOOT-HOLMAN COMPANY
SMOOT-HOLMAN
INGLEWOOD CALIFORNIA
MADE IN U.S.A.
LOOK FOR THIS LABEL FOR THE FINEST IN
INCANDESCENT AND FLUORESCENT LIGHTING

Key Interlocks (804)

R&IE is making a new line of key interlocks, including base mounted, flat mounted, transfer, detachable (door type) and padlock. To form an interlock system, two or more of the desired units can be applied to two or more movable devices, such as handles, valves, doors, plates, shafts, the manufacturer states. When this is done, one part can be moved only when another part is locked in a predetermined position. Interlocks are made of heavy bronze, with Yale tumblers and function by means of a mechanical bolt projection.

Ground Plate (805)

A new Thomas & Betts ground plate, No. 5575, is installed by means of five nails, a hammer and a screwdriver. The ground wire is stapled down the length of the pole, pushed through the protective tunnel and inserted in the wire-holding clamp; screws are then tightened. A cutaway opening provides



for visual inspection of the completed job. A puddling cup design is a feature of the plate, the cups retaining natural accumulation of moisture at the base of the pole. Stamped from solid copper, the device accommodates a ground wire up to No. 4 AWG. (insulated).

Fuse Cutout (806)

General Electric has improved the design of its flip-open fuse cutout, rated 50 amp., 7,500 and 15,000 volts. Live parts are confined to the side of the insulator opposite the mounting bracket. Mounting may be vertical, angle tilted or swiveled to any desired position; may be in separate mounting or in combination crossarm mounting or T-bracket pole mounting with G-E pellet type arrester or Hi-Stroke rural arrester.

Climbers (807)

Light-weight steel climbers for use on vertical H or I beams have been added to the Austin Supply Co. line. These climbers strap over the worker's shoes and hard-rubber spurs are designed to give 3-in. purchase on each side of the beam. According to the manufacturer, both ball and heel of foot are firmly supported and there is no chance of slippage, even on wet surfaces.

Fence Control (808)

Lionel Corp.'s Stock Watch, an electric fence control, has an airtight molded glass housing said to protect the mechanism from extremes of heat and cold and from accidental submersion. It will operate equally well on one "hot shot" type battery or four No. 6 dry cells, the manufacturer states.

Burndy Qikluqs

For wires and cables with a *happy Ending*

Neat, compact, unit assemblies. Equipped with oversize studs to prevent stripping or distortion. Eleven sizes take 40 cable sizes. Tongues for 1, 2 or 4 holes, blank and special. Straight, 45°, 90° or right angle. Single or double clamping elements for single or multiple cables. NO SPECIAL TOOLS FOR INSTALLATION.

Catalog 41 describes all Qikline and other Burndy electrical connectors. SEND FOR YOUR COPY. Burndy Engineering Co., Inc., 107-B Bruckner Blvd., New York 54, N. Y.

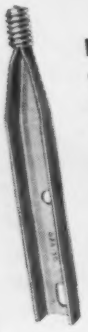
Headquarters for CONNECTORS

Burndy

for your rural line construction

OLIVER POLE LINE MATERIALS

From the complete line of Oliver Pole Line Materials you can select items designed and made specially for rural line construction. Some of these are illustrated below. A half-century of experience gives Oliver the knowledge needed for the manufacture of line materials that will have long life and give satisfactory service. See your Distributor.



POLE TOP PINS

The complete line of Oliver galvanized steel pole top pins includes straight and offset types, all commercial sizes, and various designs. The pressed steel type is shown here.

INSULATOR PINS

The pin illustrated is forged in one piece from mild steel, and is free from laps, seams and welds. Square wrench shoulder facilitates lining-up insulator groove. Other types are available as required for various services.

INSULATED CLEVISES

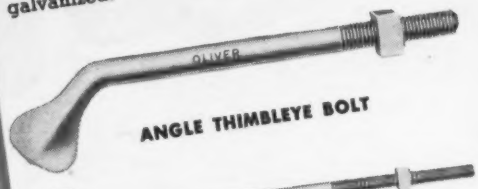
The wide variety of Oliver Clevises offers styles for every type of application and kind of construction. Styles include eye, split, swinging and plain types. Insulators are of either wet or dry type porcelain. Open hearth steel is used, hot dip galvanized.

GUY CLAMPS

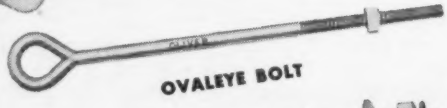
Light, medium and heavy types for one to four bolts. Straight, smooth, parallel grooves offer greater clamping area.

BOLTS

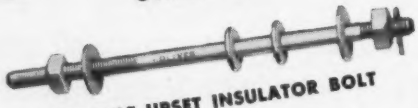
All types of bolts required for line construction are made by Oliver. Some of the more popular types are illustrated below. Features of Oliver bolts are: accurate dimensions, speed points, clean threads, hot dip galvanizing. Oliver nuts likewise are accurately made and tapped, and galvanized.



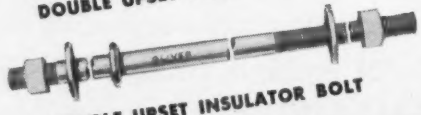
ANGLE THIMBLEYE BOLT



OVALEYE BOLT



DOUBLE UPSET INSULATOR BOLT



SINGLE UPSET INSULATOR BOLT

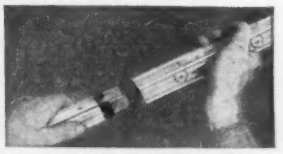
OLIVER IRON AND STEEL CORPORATION

SOUTH TENTH AND MURIEL STREETS · PITTSBURGH 3, PA.

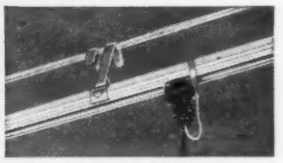
WRITE for complete data on Oliver Pole Line Materials. Ask for Catalog No. 43.

Lights added or shifted without rewiring

A stepladder is the only equipment necessary to add new lighting fixtures with a BullDog Universal Trol-E-Duct system. Simply insert the weight-supporting clamps in the duct casing and tighten the lock nuts with your fingers. Then insert the twist-out plug in the duct casing and give it a quarter turn.

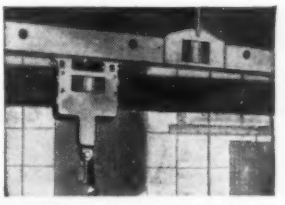


SECTIONS JOINED WITHOUT TOOLS. *Installation time cut to a minimum . . . special couplings snap into locked position automatically, hold sections together securely.*



COMPLETELY ENCLOSED FOR SAFETY. *Twistout plugs and trolleys collect current from copper bus bars safely enclosed in Universal Trol-E-Duct.*

BUSTRIBUTION DUCT FOR PLUG-IN POWER DIRECT TO MACHINE. *Machines moved without down-time for the rest of the line. A variety of circuit protective tap-off Bus Plugs for spotting and plugging in machines instantly, without rewiring.*



INDUSTRIAL TROL-E-DUCT MOVES THE POWER WITH THE TOOL OR LOAD. *Production rates go up — operating costs go down with this flexible system. Moving trolleys transmit power safely from duct bus bars to moving cranes, hoists and portable tools.*

You Can Do It With BullDog Universal Trol-E-Duct

You can have the *right light* in the *right place*—at any time and with little effort or expense. Miracle? Well, maybe just a small one. We call it Universal Trol-E-Duct.

In a plant equipped with Universal Trol-E-Duct, you can have light at the precise point where it's needed, because every inch of this continuous slotted duct is a potential electrical outlet.

You can add new lights of any type or you can move old ones. You can put small portable tools to work without long extension cords. And you can do both jobs without costly delays for rewiring.

Universal Trol-E-Duct is easily installed with prefabricated, standardized sections. Runs of duct can be altered, or completely dismantled and re-installed with complete re-use of all material.

For better production through better lighting, call a BullDog field engineer, or write for detailed descriptive folders.

BullDog also Manufactures Vacu-Break Safety Switches—SafToFuse Panelboards—Switchboards—Circuit Master Breakers—BUStribution DUCT for "plug-in" power—Industrial Trol-E-Duct for "moving" electrical loads.

BULLDOG

ELECTRICAL DISTRIBUTION SYSTEMS

BULLDOG ELECTRIC PRODUCTS COMPANY, BOX 177, R. PK. ANNEX, DETROIT 32, MICHIGAN
In Canada: BullDog Electric Products, Ltd., Toronto. Field Engineering Offices in All Principal Cities

CONSULT THE FOLLOWING PACIFIC COAST REPRESENTATIVES:

Coast Electric & Manufacturing Co.
1720 N.E. Sixth Avenue
Portland, Oregon, Tel. Garfield 2844

Safety Switchboard Company
1445 Stevenson St.
San Francisco, Calif., Tel. Hemlock 2470

Mullenbach Electrical Manufacturing Co.
2300 East 27th Street
Los Angeles, Calif., Tel. Jefferson 2224

The Story of Electromode all-electric Home Heating reaches the prospective home-builders of these National Magazines through regular advertising.

Reproduction of recent Electromode advertisement

Today's Heating System Without a Furnace

Amazing, clean, safe electric heat

Home builders have indicated great interest in "heating by wire" and Electromode All-Electric Heaters, styled for domestic use, are now in regular production to meet the increasing demand. Here are a few interesting reasons why home-heating electrically, with Electromodes, deserves this growing popularity:—

- No basement or central heating unit required.
- No storage space for fuel, no smoke, odors, dirt, or ashes.
- Electromode Room Heaters, wall-installed, take up no floor space.
- No glowing hot wires.
- Utmost economy—no power consumption except when actually in use.
- Thermostatically controlled, individually or in groups.
- Heated air is circulated near floor by a motor-driven, built-in fan.
- No fire, shock or explosion hazard.
- High thermal conductivity of finned aluminum heating element.
- Same patented heating element as that used in Electromode Heaters on U. S. Submarines. Resistors are completely insulated and sheathed within the one-piece finned aluminum casting.

The patented Electromode Heating Element, used exclusively in all Electromode Heaters, has the resistors completely insulated, sheathed, and embedded in a one-piece finned aluminum casting.

Consult your p... electrical contr... installation pa... ELECTROMO... 3, New York.

...mpany and

ELECTROMODE
All-Electric Built-in
ROOM HEATERS

WEST COAST FACTORY REPRESENTATIVES

San Francisco 3, Calif.
RUSSELL AND COMPANY
1355 Market Street

Los Angeles 15, Calif.
HARRY F. HALDEMAN, INC.
1106 South Hope Street

Seattle 1, Washington
FRED W. CARLSON
307 Wall Street

Phoenix, Arizona
JOHN W. LADLOW
P. O. Box 1784

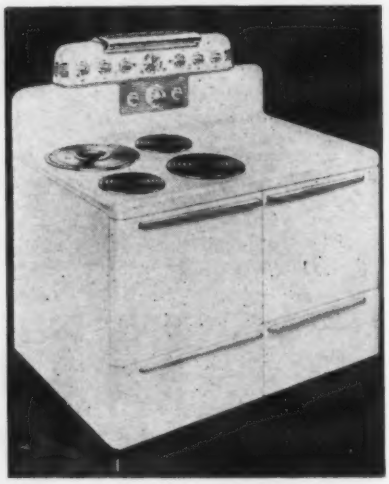
Two Position Burner (809)

Feature of the Gibson 1947 ranges is a patented "UPs-A-Daisy" two-position burner available on two of the four models. This feature by means of a raising and lowering device permits one unit to be used as a deep-well cooker or a surface burner. Deep wells on all models are Fiberglas insulated; all cooking units are Chromalox, with seven-heat switches. Full-width lamps on the two top models have been installed on higher instrument panels and switches, timer control and outlets are grouped. All ranges in

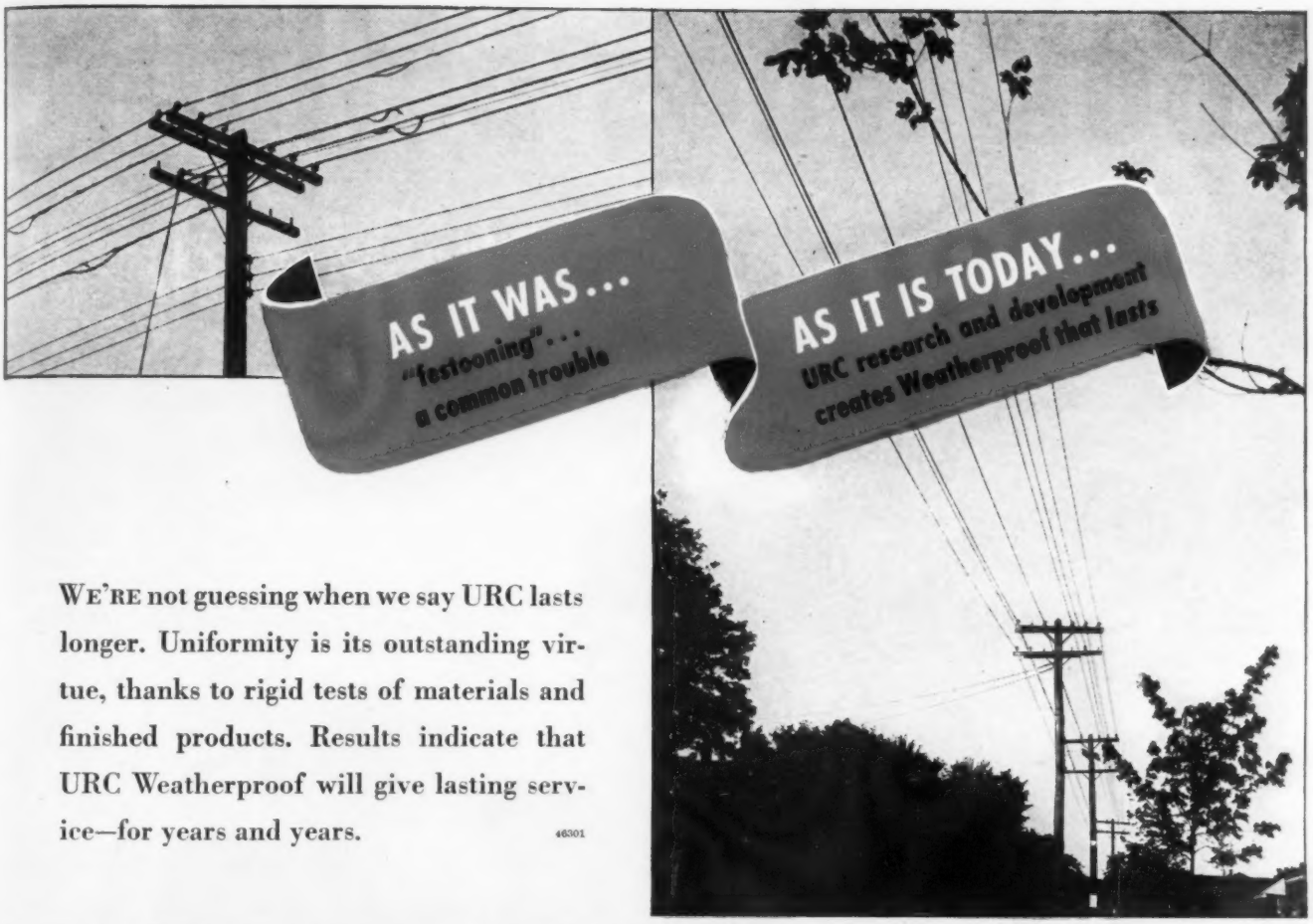
the line are 40 in. wide and 25 in. deep. The two top models are 49¼ in. high; the third is 48¾ in.; the lowest priced, which comes without lamp or timer, is 42 in. high. Ovens are 16x16x20 and are heated with two units. The top model has an extra oven, 9x16x20, with one unit, adjustable for broiling or baking.

New Range Design (810)

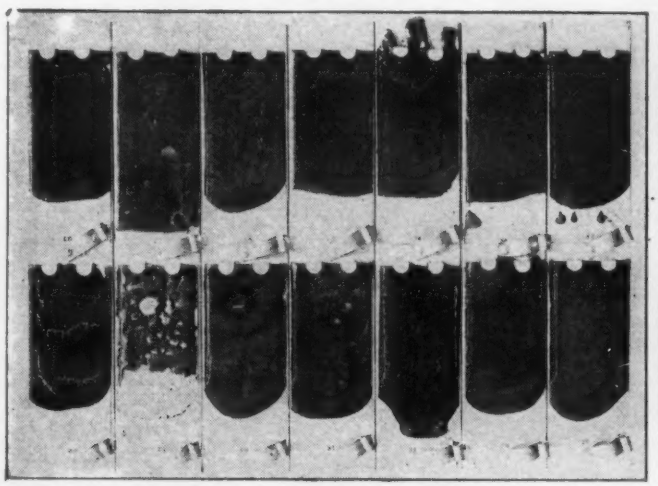
Kalamazoo Stove & Furnace Co. announces that its postwar ranges now being distributed are built on new designs. Heading the three electric models is the Carlton, which automatically controls cooking on the surface, in the oven or with appliances



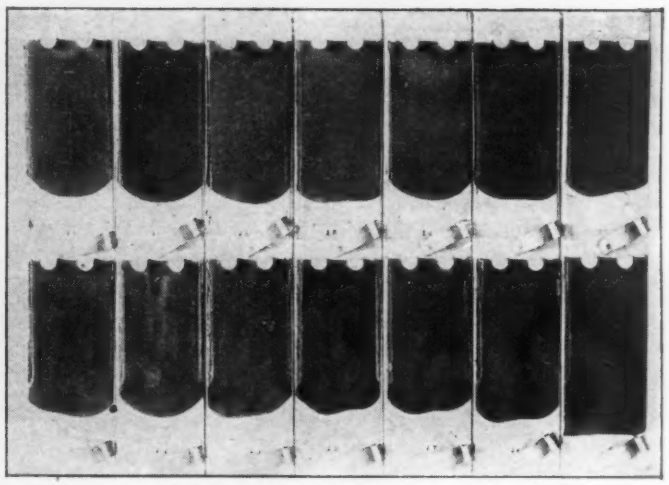
plugged into the range outlet. A thermostatically controlled warming drawer, built-in top lamp, interval timer, indicating light, non-tilt ribbon type oven racks and automatic oven light are other features of this model. All electric models have seven-speed surface units. Units are hinged for convenience in cleaning.



WE'RE not guessing when we say URC lasts longer. Uniformity is its outstanding virtue, thanks to rigid tests of materials and finished products. Results indicate that URC Weatherproof will give lasting service—for years and years. 46301



• *Old-type saturants and finishers after rigid aging tests. Note the lack of uniformity in flow and stability.*



• *URC saturants and finishers after the same tests. Consistency of these results clearly explain the longer life of URC Weatherproof.*

FOR CONTINUITY OF SERVICE
... ANACONDA TRIPLE BRAID
or DURALINE URC

ANACONDA

LOOK TO *Anaconda* FOR WEATHERPROOF THAT LASTS

Look who's building

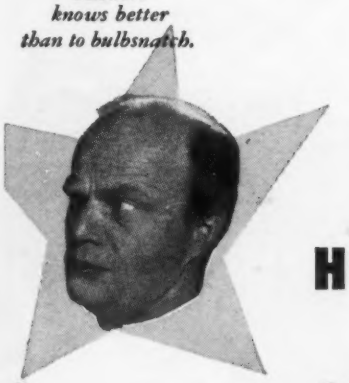
GROUCHO MARX
gives the "light touch" to bulbsnatching.

CHARLIE McCARTHY
sets a horrible example.

Don't miss the Gala Premiere . . . featuring FRED ALLEN!

Here's the first ad in G-E's new Bulbsnatching series. Look for it in the August 17 issues of Saturday Evening Post and Collier's, in Look, August 20 and Liberty, August 31. Clip it out and post it near your G-E lamp counter.

load for you now . .



EDGAR BERGEN
knows better than to bulbsnatch.

GEORGE BURNS
when he catches . . .

GRACIE ALLEN
in the act of bulb-snatching.

HOLLYWOOD'S LEADING COMIC STARS

now appearing in

G-E's GREATEST BULBSNATCHING CAMPAIGN

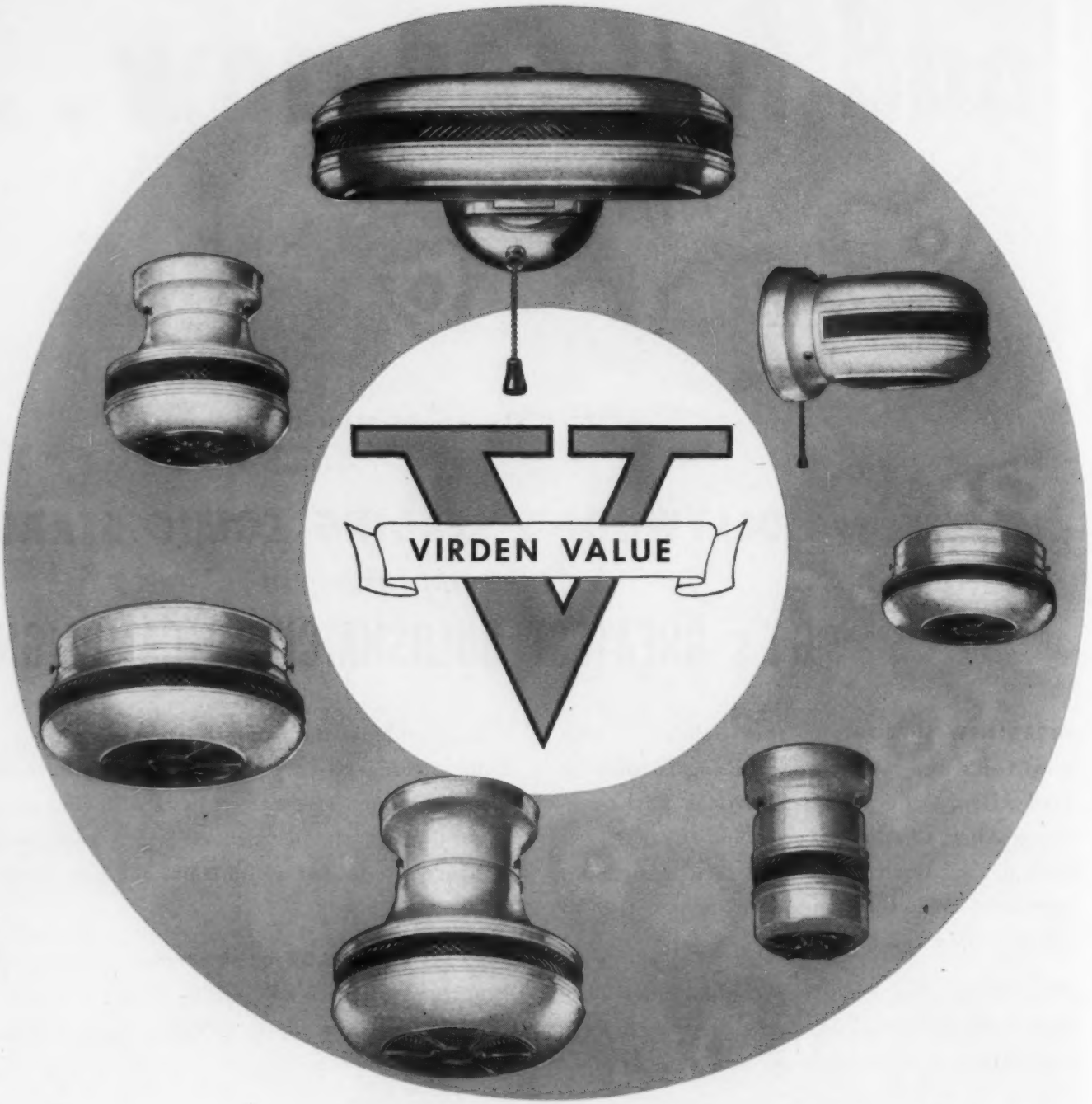
HERE'S NEW SUPPORT for your lighting promotion! G-E's new fall lamp advertising is bringing Fred Allen, Groucho Marx, George Burns and Gracie Allen, Charlie McCarthy and Edgar Bergen right to your service area to put their tremendous popularity behind a hard-hitting campaign to fill empty lamp sockets.

IMAGINE the eye-catching appeal of hilarious situations with these beloved comedians caught red-handed at bulbsnatching, that all-too-familiar practice of robbing one lamp socket to fill another. Bulbsnatching—G-E's own exclusive, sales-proved lamp promotion—is a natural tie-in with your own load-building activities, because it gives people a real incentive to *stock up* on lamps and keep every socket filled.

THAT SETS THE STAGE for an effective, fast-moving campaign, with each ad carefully designed to supplement your own efforts to keep empty sockets filled with right-size lamps.

The Anti-Bulbsnatching Campaign

is just another example of G-E's many activities that work hand-in-hand with utilities to sell better lighting.



In Good Taste for Bathroom and Kitchen

● You can provide any bathroom or kitchen with good lighting by using these interesting "Virden Value" fixtures—shown in our current catalog.

Smartly simple, with brilliant chromium plated steel holders, and enamel sprayed glass with crystal highlights of rich beauty. Easy to see that they're strictly in good taste for any home.

Just as easy to discover that they are strictly Virden Value—beating the world to the punch on the basis of dollar-and-cent economics.

Virden jobbers can supply them promptly.

The John C. Virden Company • Cleveland, Ohio

Member American Home Lighting Institute

ELECTRICAL WEST Sales Guide

NEWS LETTER FOR THE ELECTRICAL MERCHANT OF THE WEST

August
1946
©

Back under OPA

Well, here we are again, under OPA. For the month respite, the relief everyone in business felt, not to be hamstrung and hobbled, was like a new lease on life. Prices didn't jump up except in rare instances and no doubt would have sought their own reasonable level gradually. Production took a spurt and so did building. There was hope in the atmosphere again. But it went under the bureaucratic cloud again when OPA returned. The only spurt of activity came from the OPA price fixers who had been wondering if they'd get paid for their presidential standby period. Building permits dropped by half. Market places for appliances were deserted. Nobody was glad.

The shake-down

First moves by some factories, through their distributors, to sift out their excess of dealerships and franchises began quietly last month in some Western areas. There had been a question among thinking appliance people, "Who's going to start pruning first, dealers eliminating new or secondary brand lines or distributors eliminating new or shaky dealers?"

Silver tie-up

You've heard of all kinds of shortages— steel, copper, rubber, etc., but who'd have thought a silver shortage would also hold up appliance production. General Electric points out that until Congress passed a new act to permit sale of silver by the Treasury, it couldn't make silver contact points for controls, solder for hermetically sealed joints, electronic tubes and motors. Nor could anybody else.

1947 models

Norge distributors from the 11 Western States held a special pre-market sales training meeting at the auditorium of L. J. Meyberg Co., San Francisco, Aug. 2-3, unveiling ten new 1947 models— a vertical home freezer, five refrigerators, two gas and one electric range and a home heater.

Water heaters

Monitor distributors— Love Electric of Seattle, Leroy Bennett of San Francisco and Wilford Bros. of Los Angeles have taken distribution of Seidelhuber electric water heaters, made in Seattle by a pioneer iron and bronze works. Although bronze tanks are not currently available, galvanized ones are, in 40-gal. sizes, either 3.5 or 5 kw.

Spot movies

Bendix has some Hollywood-produced spot movies which its dealers of home laundry equipment can use in local movie houses.

Silly isn't it?

The AFL-CIO jurisdictional fight may hit the appliance dealers in kitchen sales. Many appliances are made by CIO workers and AFL electricians and plumbers are saying they won't install them. In southern California there's a possibility of a CIO building trades group that may, so hold your hats.

Grows

Lester Distributing Co. of Sacramento, rapidly expanding former automotive company, now handling many big lines of appliances, has taken sapce 204A at Western Merchandise Mart, San Francisco for trade contact. Roy G. Stuart, general sales manager, was there market week.

New name

A new vacuum cleaner company, McAllister-Ross Corp. of Chicago, will manufacture and distribute household vacuum cleaners. It bought out Franklin-McAllister Corp., a prewar cleaner maker. Distribution will be through 53 distributors in US and Canada.

Self-service

Self-service laundry operators, who equip apartment houses with a battery of Laundromats on rental-per-hour basis, were given a course at Mansfield by Westinghouse recently to equip them to advise users on fabrics, operation, and to themselves service these automatics.

A character

Presty is a new trade character devised by Pressed Steel Car Co. of Chicago to advertise and identify its line of Prestline electric ranges and home appliances.

Toy stoves

Toy electric stoves for the Christmas market are being made in quantities by Tacoma Metal Products Co. at a new factory at 414 Puyallup Ave. It's called "Little Chef."

Iron first

General Mills held a three-day appliance district managers' meeting at Minneapolis last month to launch the new Tru-Heat electric iron, first of its line of appliances.

Lateral pass

Before OPA came back on the CPA threw a ring of controls around manufacturers inventories of 18 products to prevent hoarding of finished inventories by appliance manufacturers. Although rumors have spread of hoarding there's no truth to most of them. What's been made has been dished out.

Reversing

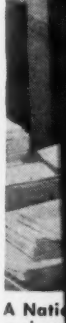
Dupont says it has a new movie film that will be especially good for television broadcasting. Scenes taken on it can be developed and by using an odd number of amplification stages the negative itself can be used for telecasting rather than waiting to print a positive.

Table models

U. S. Television Mfg. Corp. of New York, started production of a five tube radio-phonograph table model with automatic record changer. It plans console deliveries in August.

Clocks tick

California Electric Service Stations, whose electric clock repair business has just been given the Southern California Edison Co. clock changeover contract from 50 to 60 cycles, a tremendous undertaking, is expanding its northern California operations too. A new branch was opened in Oakland at 166 Grand Ave., Clyde Chamblin announces.



No. 2

Now! Frigidaire Sets a New Pace for Hiring, Training and Compensating Salesmen!

Compensating Salesmen. This new "Frigidaire Compensation Selector" tells the dealer in seconds what the salesman will earn and what the dealer's sales cost will be on any number of sales, and at any percentage. Here, George Plumly, of Appliance Sales Dept., uses an enlargement of the Selector in explaining it to field and factory personnel.

For years, the appliance dealer's No. 1 problem has been turnover in sales personnel, a problem which has cost the dealer considerable in lost time and money. Now, Frigidaire has answered that problem with a new program for building better sales forces that "stay put" and become profitable to the dealer. For instance:

Selecting and Hiring the Frigidaire way makes it possible to separate the better men right at the first interview.

Orientation the Frigidaire way makes every salesman feel he's an important member of the selling team.

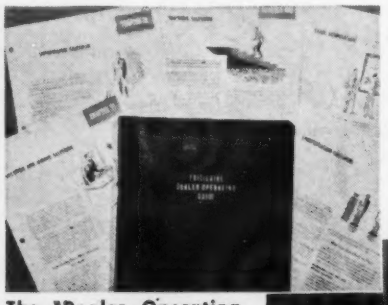
Training the Frigidaire way gives the dealer everything he needs in charts, slide films, manuals, information and instructions to help him train good salesmen to be even better.

Supervision the Frigidaire way is liked by salesmen because it makes them more productive, more profitable to themselves and the dealer.

Compensating the Frigidaire-way tells the salesman, *before he starts to work*, how much he can expect to receive weekly, monthly and yearly—in salary, commission and bonus. And it tells the dealer what his sales cost will be on any number of sales at different rates of compensation.

So, here is another example of why Frigidaire is recognized as the leader. It's this kind of thinking that makes appliance people everywhere agree that you can *Depend On Frigidaire To Do Things RIGHT.*

More Than 8,300 Figures are on the "Frigidaire Compensation Selector." Two men made 50,000 calculations to arrive at them. The Selector is considered to be the most ingenious device of its kind ever developed.



The "Dealer Operating Guide" for Frigidaire dealers. Factory prepared, it assists them in running their businesses.

A National Survey among Frigidaire dealers brought out what makes a good salesman "good"—a poor salesman "poor." C. S. Trigg and P. J. Barnaby, Appliance and Commercial Product Promotion Mgrs., check the findings of the survey.

L. A. Clark, Asst. Gen. Sales Mgr., explains that 78% of Frigidaire's promotion budget is spent on training and informing.

You're twice as sure with two great names

Frigidaire made only by **General Motors**

SELL WITH CONFIDENCE — SELL THE

"3 SEALS TO SAFETY"

GOOD HOUSEKEEPING *says:*

REPLACEMENT OR REFUND OF MONEY
Guaranteed by Good Housekeeping
IF DEFECTIVE OR NOT AS ADVERTISED THEREIN

"We give this Seal to no one—the product that has it, earns it."

UNDERWRITERS' LABORATORIES *report:*

LISTED UNDER RE-EXAMINATION SERVICE UL OF UNDERWRITERS' LABORATORIES, INC.

"The Minute-Savor Pressure Cooker withstood more than 7 times normal working pressure."

Backed by National Advertising and Complete Promotional Program!

The continuing national color advertising schedule which started with the July issue of Good Housekeeping expands in September to include in addition Better Homes & Gardens, Farm Journal and Sunset.

Take full advantage of this powerful campaign by using Sales Training Material and by tying-in at the point-of-sale with Counter Cards, Window Displays, Booklets and Local Newspaper Advertising—all available to Universal dealers.

NATIONAL COLOR ADVERTISING

COUNTER DISPLAY

WINDOW DISPLAY

SALES TRAINING

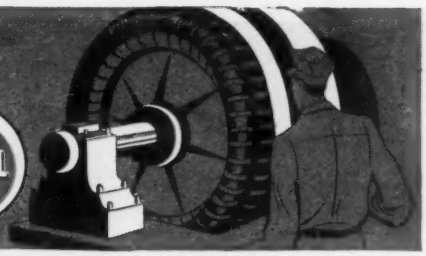
CONSUMER BOOKLETS

MAT SERVICE

LEADERSHIP *that* BUILDS *Your Dealership*

LANDERS, FRARY & CLARK • NEW BRITAIN, CONNECTICUT

STANDARD ENGINEERS NOTEBOOK



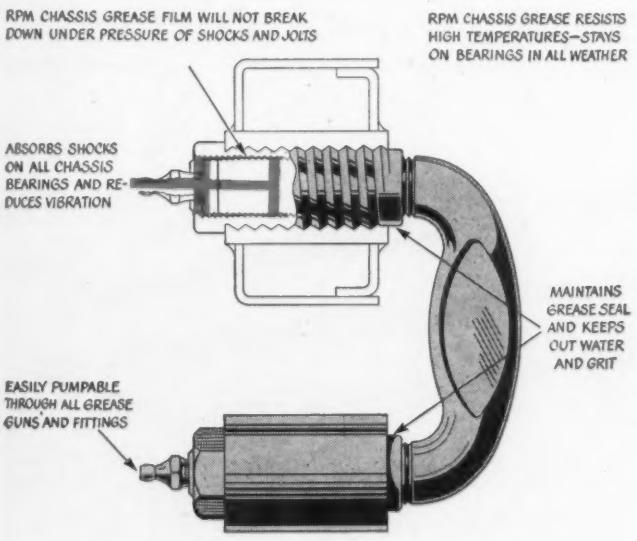
Shock-absorbing grease reduces shackle wear

Because it contains a special stringiness agent that keeps a tenacious lubricant film on shackle and other chassis bearings, RPM Chassis Grease will eliminate squeaks and cut wear to a minimum.

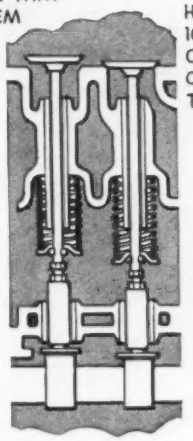
Besides using it on chassis bearings, many truck and bus operators lubricate heavy-duty tractor fifth-wheel bearing surfaces with RPM chassis Grease.

The tough lubricant film acts like a cushion. It absorbs countless shocks imposed on bearings and will not rupture even under an overload. This unusual ability also reduces vibration and makes vehicles ride smoother.

Highly resistant to heat and moisture, RPM Chassis Grease seals out water and grit on and at the edges of bearings. It may be applied easily in cold weather and protects vital wear-points in summer.


RPM CHASSIS GREASE FILM WILL NOT BREAK DOWN UNDER PRESSURE OF SHOCKS AND JOLTS
RPM CHASSIS GREASE RESISTS HIGH TEMPERATURES—STAYS ON BEARINGS IN ALL WEATHER
ABSORBS SHOCKS ON ALL CHASSIS BEARINGS AND REDUCES VIBRATION
MAINTAINS GREASE SEAL AND KEEPS OUT WATER AND GRIT
EASILY PUMPABLE THROUGH ALL GREASE GUNS AND FITTINGS

U-TYPE SPRING SHACKLE


RPM HEAVY DUTY MOTOR OIL CONTAINS DETERGENT THAT KEEPS ENTIRE OIL SYSTEM CLEANER. PREVENTS VALVES FROM STICKING
HIGH VISCOSITY INDEX, 100% PARAFFIN BASE OIL. RESISTS HIGHEST OPERATING TEMPERATURES
COMPOUNDS RESIST OXIDATION, CORROSION AND FOAMING
RPM HEAVY DUTY MOTOR OIL REDUCES RUNNING AND STARTING WEAR—STICKS ON HOT SPOTS
CARRIES CONTAMINANTS AWAY WITH DRAININGS

Heavy-duty oil improves engine valve action

Valves in truck and bus engines using RPM Heavy Duty Motor Oil will wear less and function correctly for a much longer time than those in engines using an ordinary oil.

RPM Heavy Duty Motor Oil is compounded. One of the compounds it contains keeps sticky carbon and other deposits from forming around valve guides and makes sure they are lubricated thoroughly. Thus, extra wear which might interfere with proper valve action is prevented.

Other compounds in RPM Heavy Duty Motor Oil help it adhere to all wear-points in an engine, whether they are hot or cold, keep rings, pistons, and cylinders cleaner, resist sludge formation, prevent corrosion and stop foaming.

RPM Heavy Duty Motor Oil has a one hundred percent pure paraffin base. It will resist the highest operating temperatures.

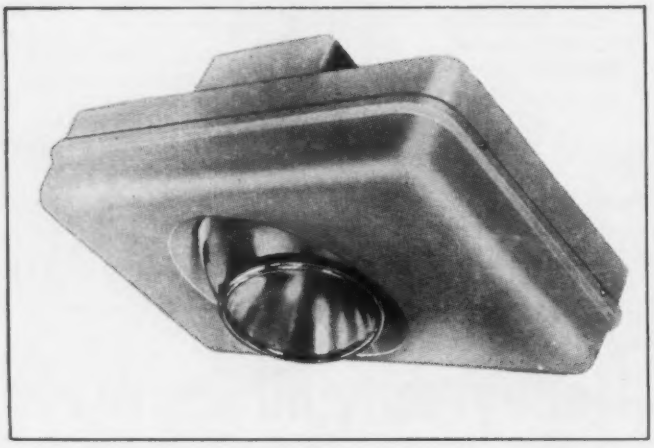
Standard Fuel and Lubricant Engineers are always at your service. They'll gladly give you expert service—make your maintenance job easier. Call your local Standard Representative or write Standard of California, 225 Bush St., San Francisco 20, California.

FOR EVERY NEED A STANDARD OF CALIFORNIA JOB-PROVED PRODUCT

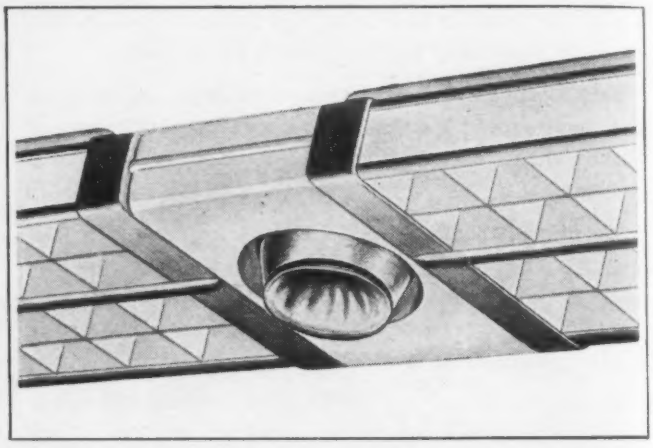
SYLVANIA NEWS
CENTRAL STATION EDITION

AUGUST *Prepared by* SYLVANIA ELECTRIC PRODUCTS INC., Salem, Mass. 1946

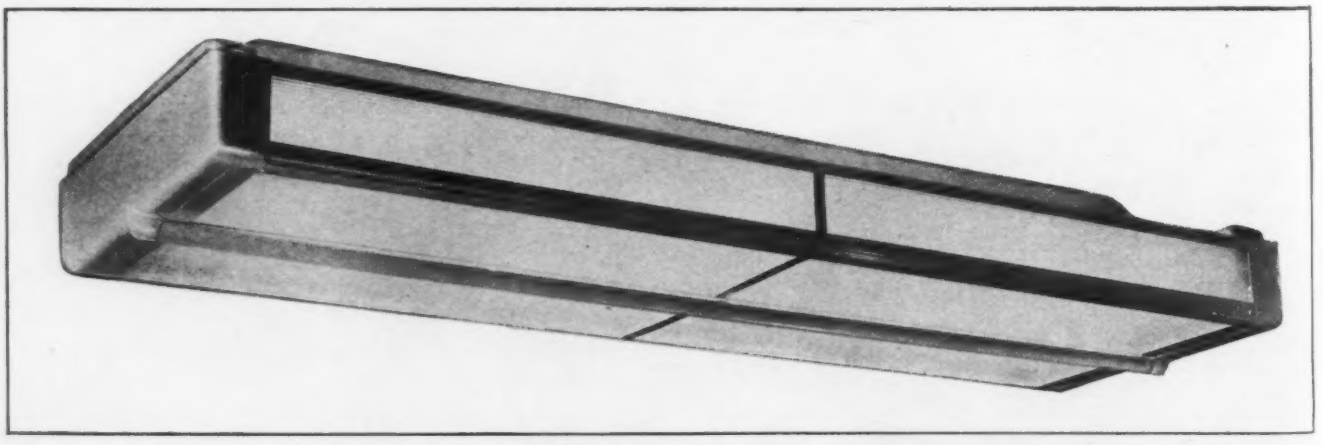
INCANDESCENT AND FLUORESCENT LIGHTING COMBINED BY VERSATILE SYLVANIA FIXTURES



Here is the new Sylvania CP-150 adjustable incandescent spotlight. This powerful unit will find wide use in stores, theatres, entrances, window displays—for focusing attention where it is wanted. CP-150 can also be joined with fluorescent fixtures to form a combination lighting unit.



The CP-150 spotlight is shown joined with two Sylvania CL-440 fluorescent fixtures—all three being members of the same "design family." Provides accent lighting plus general illumination. (The CP-150 can also be turned to its narrow side and centered between fixtures of *two* 40-watt lamps each.)

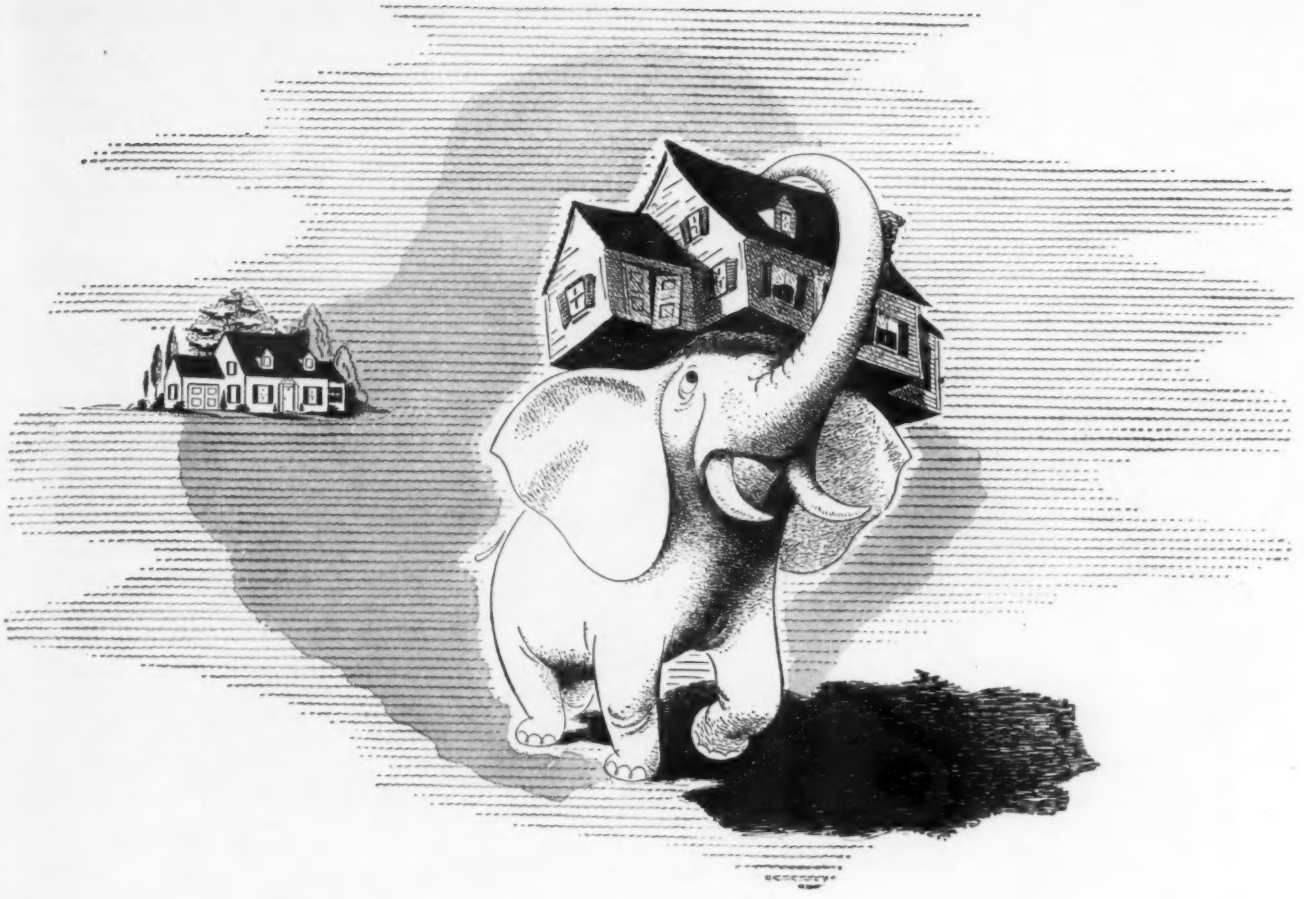


This is the Sylvania CG-440—glass shielded version of the CL-440 fixture (above right). Containing four 40-watt fluorescent lamps, this fixture has the beauty and modern appearance required by the most exclusive shops and offices.

These new fixtures are examples of Sylvania's pioneering in new and improved lighting equipment. With the cooperation of public utilities, this work has been bringing more and better light to an ever increasing number of users.

SYLVANIA ELECTRIC

MAKERS OF FLUORESCENT LAMPS, FIXTURES, WIRING DEVICES; ELECTRIC LIGHT BULBS; RADIO TUBES; CATHODE RAY TUBES; ELECTRONIC DEVICES



white colonial, 1946 white elephant, 1956

don't let today's dream home become tomorrow's disappointment . . .

because of inadequate wiring

Right now, your job as an electrical contractor bears an important new responsibility. With costs of new homes limited, it's up to you to keep a "skimpy" electrical system from limiting their livability and future value. At the same time, you'll be protecting your own income and future reputation.

Today, a small, unpretentious house requires more *thorough electrical planning* than any house of the same type ever required before. It will be bought and occupied by people who are counting on *electrical conveniences* to make up what they lack in space and elaborate architecture. They'll want plenty of outlets, wired to handle everything from toasters to television. They'll want lighting to make small rooms look spacious.

By working with local builders and architects now, you can verify the fact which General Electric has already emphasized: *that adequate wiring adds more value per dollar to a home than any alternative use of the same few extra dollars.*

To aid you, G.E. has prepared hard-hitting booklets for homebuilders. You can use them to stave off electrical "skimping" . . . to sell the combination of *better wiring materials* and a better wiring job. Just write for *Adequate Wiring Help* to Section AW1-818, Appliance and Merchandise Department, General Electric Company, Bridgeport, Connecticut.

GENERAL ELECTRIC

"Meet the *Color Guard*" I said

"What does he guard?" asks the lady.

"The color of your toast, Madam," I replied.

"But doesn't any *toaster do that?" she questioned.*

"No. Proctor toasters are different," I explained. "It's the only toaster that automatically changes the toasting time—to get the same color toast from moist bread or dry—even though the moist bread may take three times as long to toast."

"How's that?" she said.

"Because the color guard thermostat stands up next to the bread, and when it gets to just the right heat for the color you want, pops it up. Since the color guard only works on the temperature of the toast you can even put cold toast back in and pop it up at fresh toast temperature without burning."

"My, my," says she, "Where's the 'Color Guard' been all my life?"

PROCTOR

***NEWSMAKER* IN APPLIANCE MERCHANDISING**

PROCTOR ELECTRIC COMPANY, PHILADELPHIA 40, PENNSYLVANIA

Light Meter (811)

A simplified light meter which can be read in "levels of lighting" instead of foot-candles is available from Westinghouse, which states that the new design followed a survey among utility home lighting consultants. Lighting levels are graded alphabetically from A through E to correspond with the degree of difficulty involved in various home seeing tasks. On the back of the meter is a digest table of IES foot-candle values for residential lighting, corresponding to the lighting levels.

Nursery Lamp (812)

A nursery lamp utilizing the round fluorescent Christmas tree bulb manufactured by Sylvania has been announced by that company and Gibson Products Co. The lamp represents an animal with a ball and is made in pastel colors with yellow, coral or blue fluorescent bulbs. Operating cost is said to be approximately two cents a month, allowing ten hours use per night.

Bracket Fan (813)

The Pacemaker, an 8-in. non-oscillating desk bracket fan announced by Westinghouse, is finished in black with polo green trim. This unit has a positive clamping swivel adjustment to prevent creeping. It has three wide-area type blades of one-piece steel construction, a welded steel guard and brushless 2-pole induction type motor. Over-all dimensions are 10½x9⅜x6⅜ in.

Automatic Washer (814)

Barlow & Seelig's Speed Queen automatic washer is a top loading machine, said to require only 10 gal. of water for a full load and to complete its washing, rinsing and

damp drying cycle in 23 to 29 min. According to the manufacturer, a full load of clothes is turbulently oscillated 144 times a minute. The hydraulic brake principle is employed in rinsing and damp drying, the machine containing no spinner or wringer.

Tray Washer (815)

The Little Giant tray washer, again in production, is adjustable to any size laundry tray, is said to do a 9 lb. wash in 20 minutes. The new model has the patented Gyrator agitator; wringer pressure selector, automatic timing selecter, automatic reversing water flume.

New answers to your questions about *Certified Ballasts*

In our last two ads, we said...

1. Certified Ballasts are built to exacting specifications.
2. They're Certified as meeting the specifications by Electrical Testing Laboratories, Inc.
3. They assure good lamp performance—good fixture operation.
4. They're built for long life, no excessive heating; they're quiet—and they *cost no* more than other ballasts.

Get Certified Ballasts for protection and service!

Certified Ballasts "Cover the Waterfront"

Q. Do all the advantages offered by Certified Ballasts apply to all types of fluorescent lighting applications?

A. Yes. Besides standard fluorescent tubes, testing and certification of ballasts applies to slimline fluorescent tubes and to circular fluorescent for portable lamps.

Q. What about portable lamps for home use?

A. The use of Certified Ballasts in home lighting equipment is VITALLY IMPORTANT. For example, Certified Ballasts properly installed can prevent heat and noise that would make an otherwise good portable lamp a liability and a nuisance.

Q. How will the user recognize the difference between a Certified and non-Certified ballast?

A. He may not recognize the difference unless *you* make a distinct selling point of Certified equipment . . . and clearly explain the advantages. It pays to emphasize *protection* . . . with Certified Ballasts.

Q. What lighting equipment manufacturers now use Certified Ballasts?

A. Certified Ballasts are used in Certified Fleur-O-Lier fixtures, Reflector Lighting Manufacturers (RLM), Certified Lamp Makers (portable lamps), and hundreds of individual manufacturers.

The Certified Ballast program is open to all manufacturers who comply with the engineering specifications.

Certified Ballast Manufacturers

Makers of Certified Ballasts for Fluorescent Lighting Fixtures

The Acme Electric & Mfg. Co.
Cuba, New York

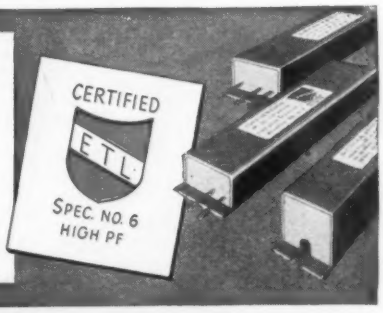
Chicago Transformer Div.
Essex Wire Corporation
3501 Addison St., Chicago, Illinois

General Electric Co.
Specialty Transformer Division
Fort Wayne, Ind.

Jefferson Electric Co.
Bellwood, Illinois

Sola Electric Co.
2525 Clybourn Avenue
Chicago 14, Illinois

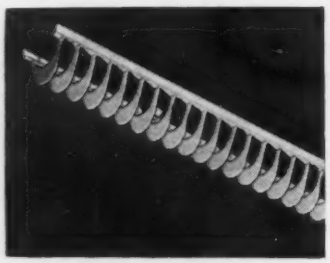
Wheeler Insulated Wire Co.
378 Washington Ave., Bridgeport, Conn.



FLUOR-O-SHIELD*

Light Diffuser for Fluorescent Lamps!

No glare—greater efficiency.
Does not cast shadows.



Made of lightweight aluminum, finished in white baked enamel.

. . . means improved lighting for factories, offices and stores

Fluor-O-Shields afford keener visibility by eliminating glare, minimizing stroboscopic effect, diffusing evenly and softening the light of fluorescent lamps. Better lighting means more efficient work, more sales and improved conditions for store displays, office layouts and production lines.

In exactly 2 seconds you can mount a Fluor-O-Shield (2 sizes) on either a 40 watt or 20 watt fluorescent lamp. Fluor-O-Shields fit practically all exposed lamp fluorescent fixtures—single or multiple lamp units. Snap-on clips permit instant mounting without screws, bolts, or tools. Complete offices, stores and factories can be equipped with Fluor-O-Shields in a surprisingly short time.

Suitable for continuous or unit mounting. Made of lightweight aluminum, finished in white baked enamel. Fluor-O-Shields cause no stress or strain on lamps, sockets or fixtures. If your distributor does not stock Fluor-O-Shields, write us for name of distributor who can supply you, or ask your distributor to write us.

- **Eliminates Glare. Diffuses Light Evenly**
- **For Factory, Office, Store, Home Lighting**
- **Fits Nearly All Open-Face Fluorescent Fixtures**
- **Practical. Inexpensive. Decorative**

SPECIFICATIONS

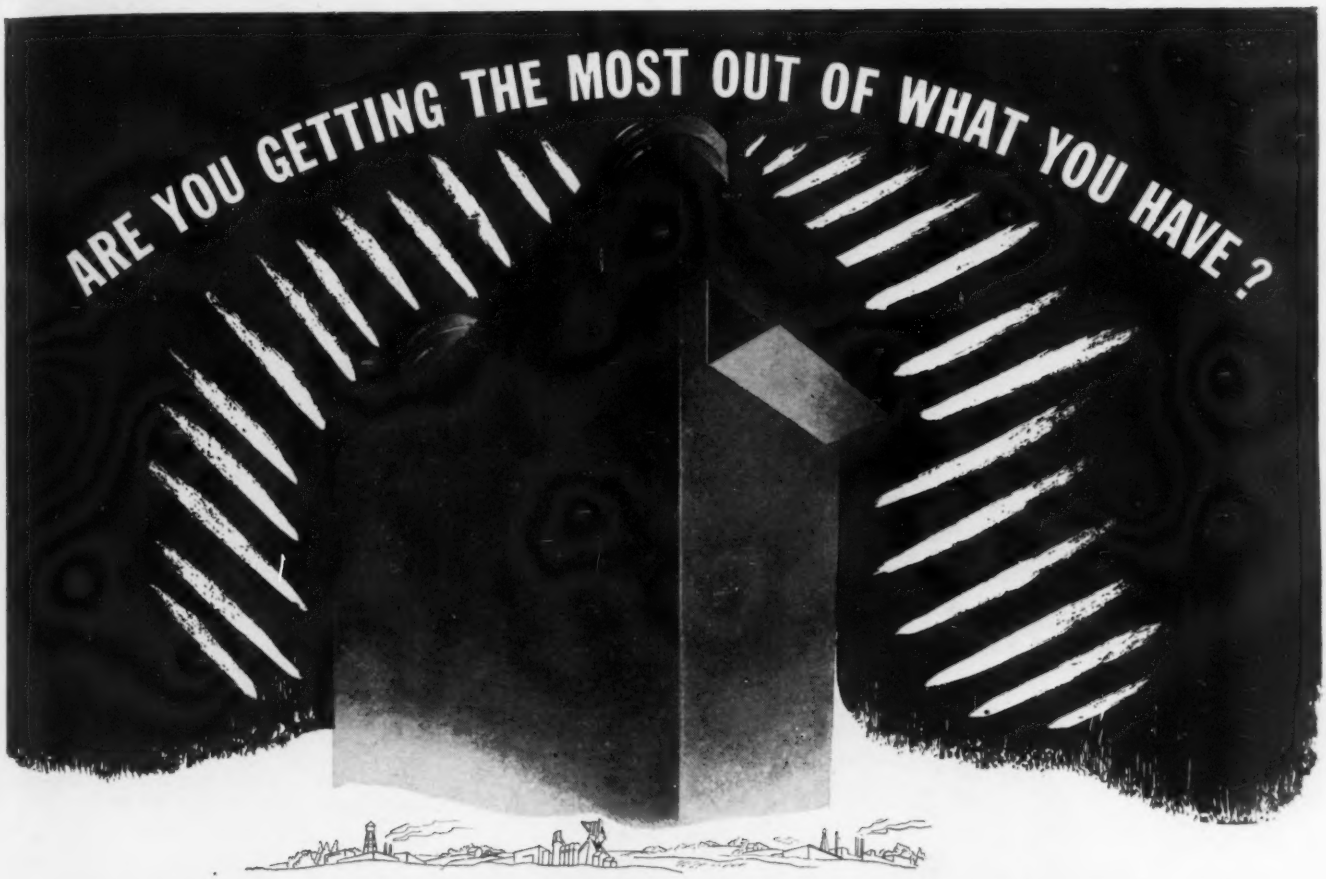
Cat. No.	Length	Fits Lamp	Units Per Pkg.
27-1-40	46⅞ in.	40 watt	12
27-5-40	22⅞ in.	20 watt	12

Represented Nationally by
D. E. SANFORD CO.
NEW YORK • BOSTON • PHILADELPHIA
ATLANTA • CHICAGO • ST. LOUIS
SAN FRANCISCO • LOS ANGELES
DALLAS • SEATTLE

$1.95 40 watt 46⅞ in. **$1.25** 20 watt 22⅞ in.

*Trade Mark—Patent Pending

FLUOR-O-SHIELD* by CAMFIELD MANUFACTURING COMPANY • GRAND HAVEN, MICHIGAN



C-D CAPACITORS

will increase system capacity quickly, economically

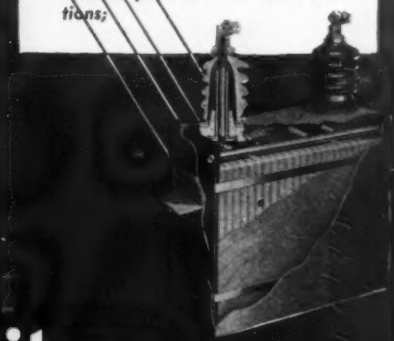
Maximum expansion of your system capacity calls for C-D Capacitors. Capacitors can be installed easily with a minimum of man-hours and soon pay for themselves. They release generator capacity, increase substation loadability, boost feeder capacity, raise voltage level.

The internal construction of C-D's four petticoat wet-process glazed porcelain bushing affords longer creepage path with less breakage hazard. The top of the bushing is fitted with a sturdy solderless connector — a C-D development. The bushing is double-sealed to the case by Bakelite heat-reactive varnished cork gaskets, held under pressure by heavy 7/16" solid brass studs. In operation, this construction has proved its value against leakage.

Installed at critical load points, C-D Capacitors are easily moved to other locations as need arises. They provide the physical and electrical flexibility to meet your power-factor requirements. Consult a local C-D field engineer or write Cornell-Dubilier Electric Corporation, South Plainfield, New Jersey.

NOTE QUALITY FEATURES:

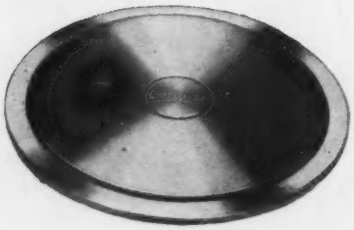
1. *Four petticoat wet process porcelain bushing.*
2. *Uniform stacking of sections;*
3. *Sturdy steel tension bands equalize pressure throughout capacitor;*
4. *Compact rigid end plates assure uniform pressure on stacked sections;*



Cornell-Dubilier Capacitors

FOR POWER-FACTOR IMPROVEMENT

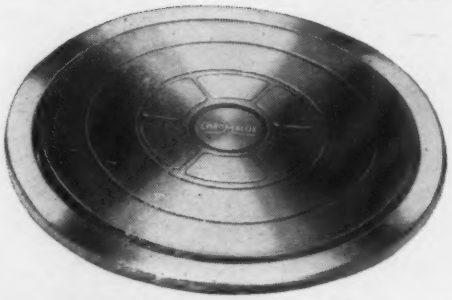
CARRIER CURRENT COUPLING • SURGE PROTECTION



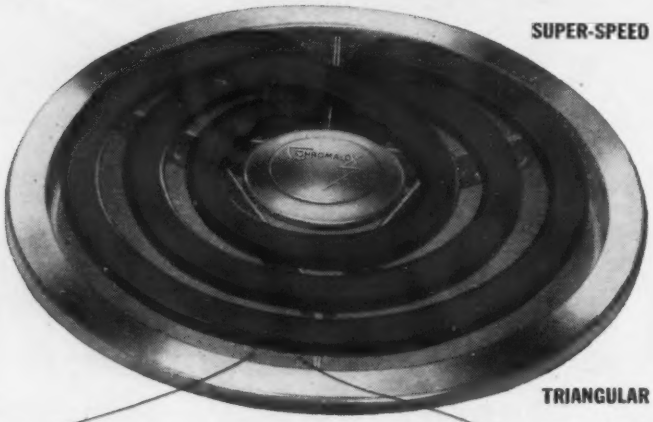
Everyone Agrees,

HEATFLO

they're a fast selling trio!



SUPER-SPEED



TRIANGULAR

CHROMALOX

Electric Range Units for Replacement

on any Make or Size Electric Range

Service calls are filled in minimum time with maximum customer satisfaction when you feature fast-selling CHROMALOX Units for Electric Range Replacement.

This popular trio and a supply of CHROMALOX Adaptor Rings are all you need to insure *perfect* fit in *any* range opening. More Sales! More Profits! Less Effort!

Put CHROMALOX to work building your replacement sales. Order a supply of Range Units today. For information on *Triangulars, Super-Speeds* and *Heatflos,* write for Catalogs.

on new ranges and for replacement

CHROMALOX

means ELECTRIC Cooking at Its Best!

RC-16

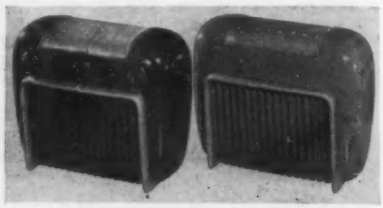
EDWIN L. WIEGAND COMPANY, 7540 Thomas Blvd., Pittsburgh 8, Pa.

MONTGOMERY BROS., 1122 Howard Street, San Francisco 3, Calif.; 911 Western Ave., Seattle 4, Wash.; 2333 N. W. Westover St., Portland 10, Oregon; 741 E. Eighth St., Los Angeles 21, Calif.; THE PETERSON CO., 1921 Blake St., Denver 2, Colo.

1946 Additions (816)

Three sets have been added to Stewart-Warner's 1946 line. These new models include a single-band a-c, d-c table set in maple, walnut or blond modern finish wood cabinet; a two-band a-c, d-c table set in plastic cabinet and a two-band a-c high-fidelity console combination in walnut or mahogany finish wood cabinet.

End Table Model (817)



Crosley has added nine radio models to its original 1946 line: four table sets, two console combinations and three Duette end-table models. The Duettes, 7x5x12 in., are styled the same, front and back, with totally enclosed chassis; have slide-rule dial on top; are furnished in mahogany, tan and blue plastic. A portable model is built for a-c, d-c and battery operation, has a shock-proof gunmetal case and handle. One of the a-c, d-c table models has a retractable carrying handle for easy portability.

FM Sets (818)

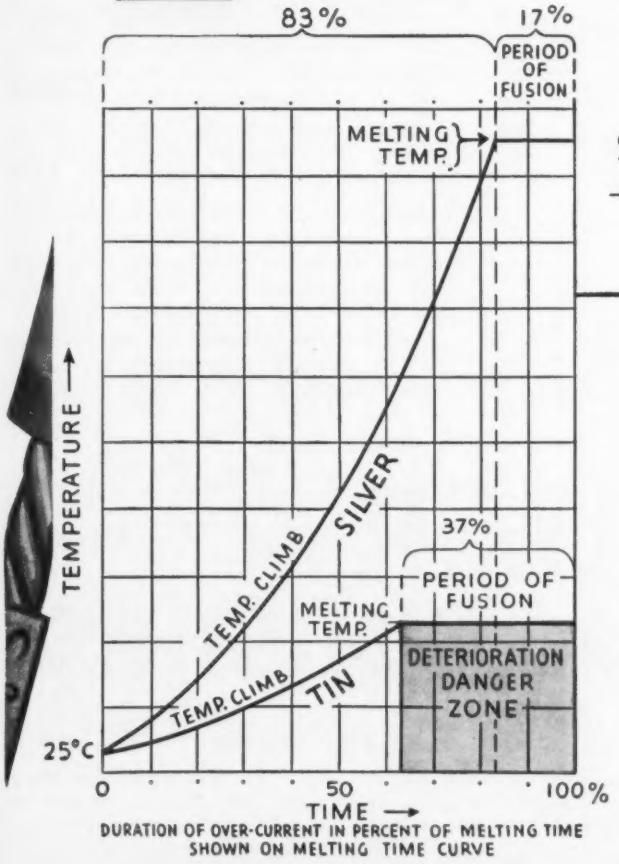
New Bendix radio models include an FM table set and an FM radio-phonograph. These FM models incorporate a ratio detector, gang-shift tuning and a new type of mechanical push-button assembly.

Percolator (819)

Landers, Frary & Clark has announced production of its Coffeematic, an automatic percolator with capacity of seven, 5-oz. cups. A dial at the base can be set for strong, medium or mild and a signal light automatically indicates when coffee is ready to serve. Current is then automatically reduced to keep coffee at serving temperature and an indicator light remains on until the unit is disconnected. This unit is chromium plated, has a 6-ft. cord and heating unit of 400-75 watts; is equipped with a patented cold water pump said to start percolation quickly.

Electric Turntable (820)

General Die and Stamping Co. has resumed production of its Roto-sho electric turntable in the 18-in. table size. This model operates on 110 volts a-c, will carry up to 200 lb., turning three times a minute.



DURATION OF OVER-CURRENT IN PERCENT OF MELTING TIME SHOWN ON MELTING TIME CURVE

Only S & C

SILVER FUSE LINKS

Give You This Extra Protection Against Unnecessary Outages

Performance records of large operating companies provide positive proof that S & C Silver Fuse Links save outages, service trips, and customer annoyance. That is because only S & C Silver Fuse Links can offer you all of these vital fuse operation features:

High Surge Capacity
***Resistance to corrosion and deterioration**
Uniform Quality
***Sustained accuracy of time-current characteristics**
Mechanical Strength

S & C Silver Fuse Links are designed from a background of 35 years of high voltage fuse specialization and are constructed with a pure silver fusible element. One reason for their greater dependability is graphically illustrated in the accompanying diagram, and this feature alone can save you, as it now saves others, a lot of man-hours, truck-miles, and customer complaints.

S & C Silver Fuse Links may be used in all makes of cutouts. For full information ask for Bulletin 218-B.

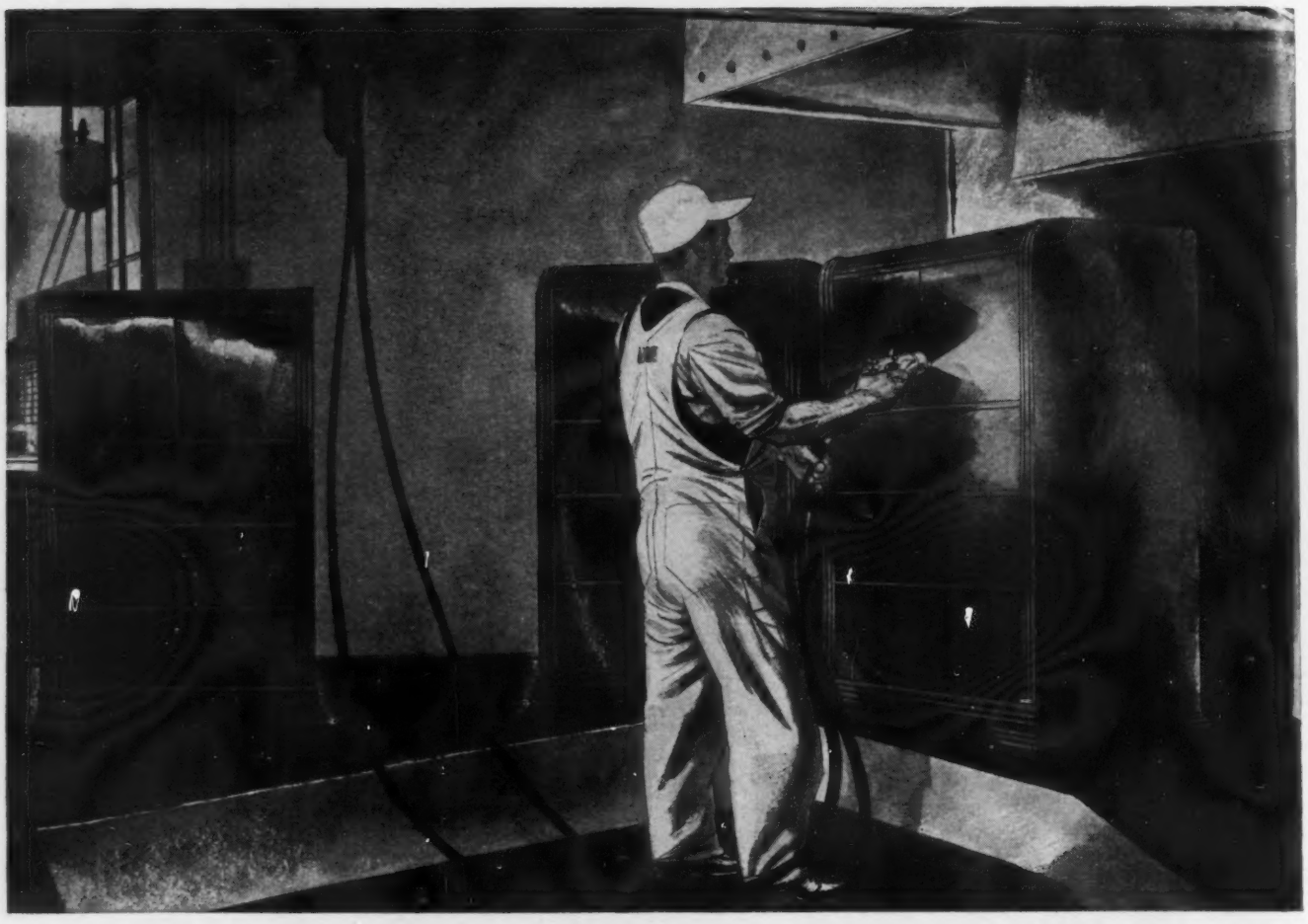
SCHWEITZER & CONRAD, INC.
4425 Ravenswood Avenue Chicago 40, Illinois, U.S.A.

Represented in Principal Cities (Consult Telephone Directory)

*Analysis of time and temperature factors in fuse melting reveals that, after melting temperature has been reached, only 17% of the melting time is required by the silver element to supply the heat of fusion and complete separation . . . as compared with 37% required by a tin element. In this range lies one possibility of damage to the fusible element, and change in its time-current characteristics.

The graph shows that there is a time advantage in favor of silver by an important margin. But in addition, the physical and chemical stability of silver, to the point of complete fusion, and the strain-relieved helical-coil construction, permit sudden thermal expansion of the element without damage.

It has been fully demonstrated, in laboratory and field experience, that surges or short circuit currents which do not sever the fusible element do not alter the time-current characteristics of S & C Silver Fuse Links.



$P^c + S^a + O^s = P^3 \times R^o$

A FORMULA OUR CHEMISTS CONSTANTLY CONSIDER

It's a basic formula! Production costs, *plus* sales appeal, *plus* owner satisfaction *equal* profit three ways (for manufacturer, jobber and retailer), *times* the repeat orders that keep sound merchandise moving.

Our technicians consider the whole formula. When they tailor-make a finish for the furniture industry, for instance, they keep that industry's production costs in mind, yet give them that product attractiveness and durability that keep sales departments proud.

Before we create a finish we determine its purpose, and the service it is expected to give —whether it's a production finish for wood, plastic or metal products, or surface protection for ships, machines, aircraft, buildings, homes or a farmer's fence posts.

True, we're the West's oldest paint and lacquer manufacturers. And we're still pioneers at heart—still challenging ourselves on every hand to make still better paint products to give still better service. W. P. Fuller & Co. Factories, San Francisco, Los Angeles, Portland. Branches and warehouses in principal Western cities.

"We never have to fight a Fuller Finish"

"That means no production lag," continued the finishing foreman. "You make it right. It sprays right, dries right and gives the mileage. That's what keeps the front office happy!"

FULLER *Industrial* FINISHES

AIRCRAFT FINISHES

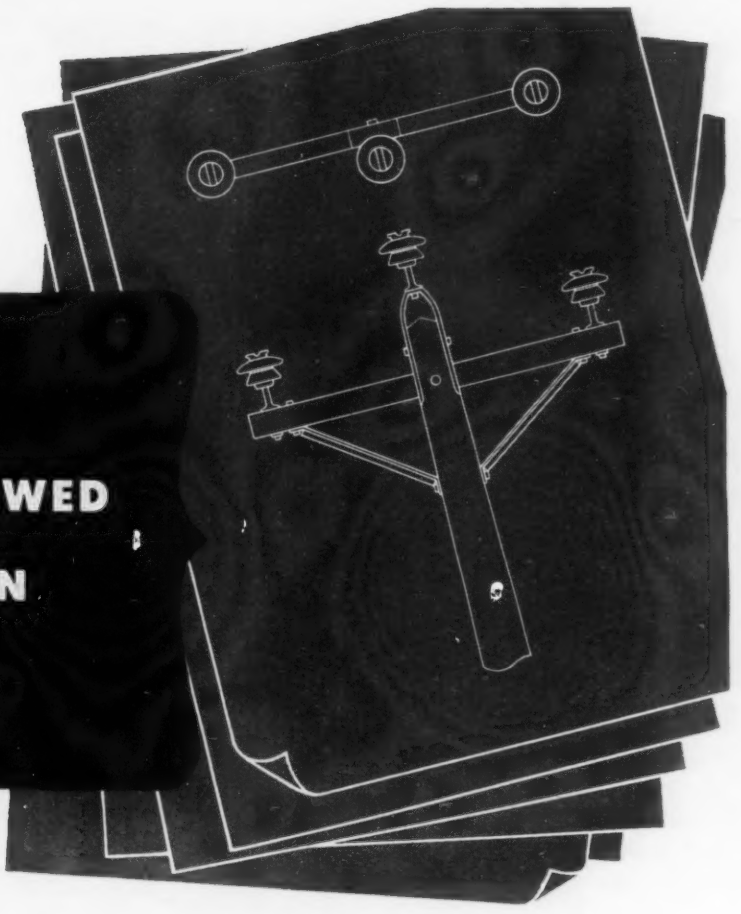
War-proved Fuller Aircraft Finishes outstanding for hard service. Now they're available for private plane owners. See your Airport Refinisher.

MAINTENANCE FINISHES

Fuller Color Engineering makes color *work in your plant* to decrease accidents, direct traffic, increase efficiency. Free illustrated book upon request.

MARINE FINISHES

Fuller Marine Finishes mean lower maintenance costs, less frequent tie-ups for repainting. Stem-to-stern protection —underwater, atmospheric.



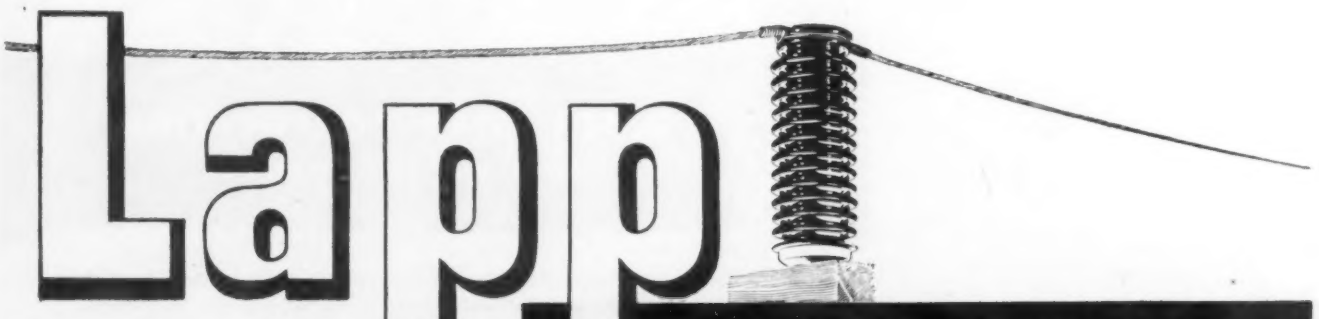
HOW LONG SINCE YOU'VE REVIEWED YOUR CONSTRUCTION STANDARDS?

A standardization program, intended to save your company money and improve dependability of your system, may be having directly the opposite effect if it is not up to date, incorporating the improved construction methods and materials of the recent years.

Our question is pointed directly at the insulators on your high tension lines. *Do your standards call for, or recognize Line Posts for transmission up through 66 Kv?* If not, you're inviting trouble and extra expense with every conductor you string.

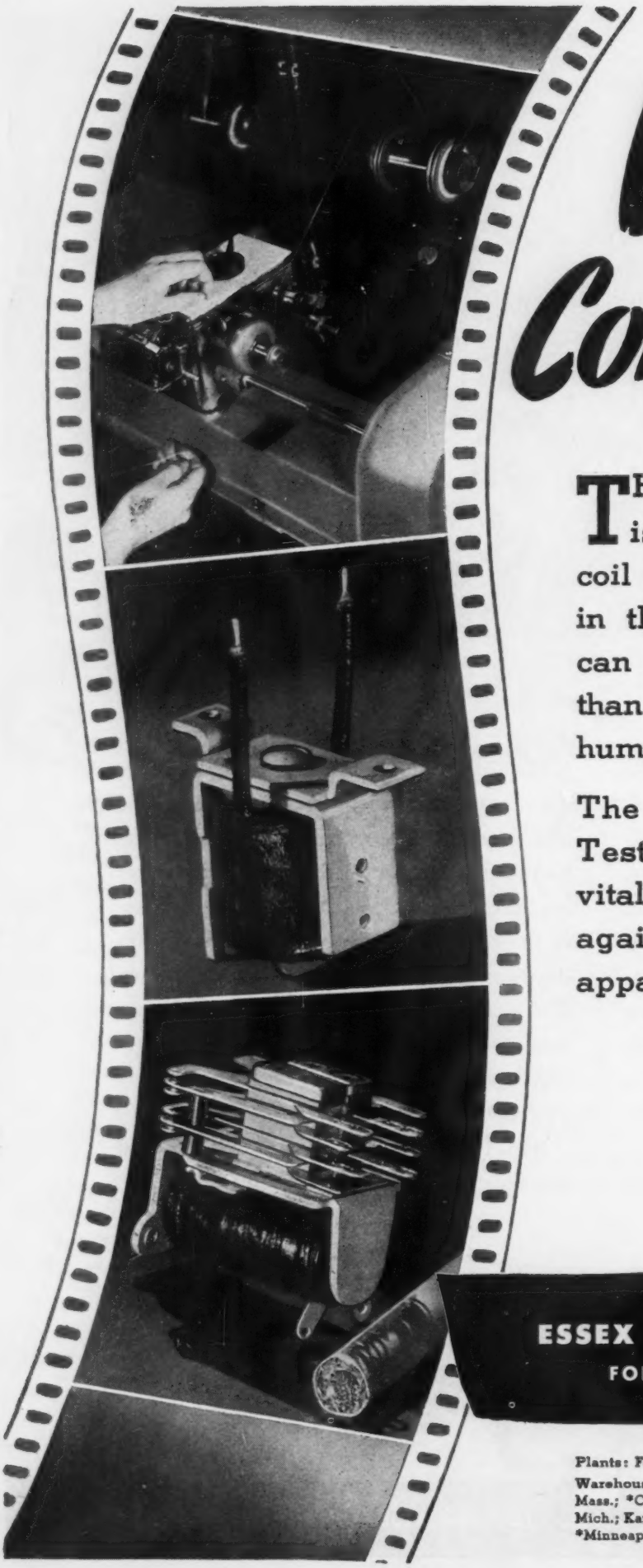
The Lapp Line Post is now more than 15 years old. In that 15 years it's run up a service record unmatched by any insulator design in transmission history. A record for handling dirt conditions, power arcover, mechanical attack—a performance written in the maintenance service records of hundreds of power companies. A service record that adds up to one unchallengeable fact: *Lines on Lapp Line Posts have fewer outages, require less maintenance and insulator replacements than lines on any other insulators.*

Better get Lapp Line Posts on your standard specifications now.



Lapp

LAPP INSULATOR COMPANY, INC., LE ROY, NEW YORK



VITAL CONTINUITY

THE heart of a relay is the coil—wire in the coil the bloodstream. Flaws in the wire of a relay coil can no more be tolerated than imperfections in the human bloodstream.

The use of Essex Extra Test Magnet Wire in the vital spot is a real hedge against a high electrical apparatus mortality rate.

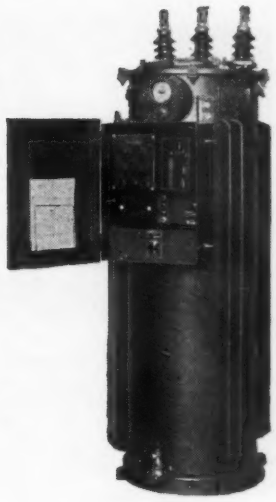
WIRE SX PRODUCTS

ESSEX WIRE CORPORATION
FORT WAYNE 6, INDIANA

Plants: Fort Wayne, Indiana; Detroit, Michigan; Anaheim, Calif. Warehouses* and Sales Offices: *Atlanta, Georgia; *Boston, Mass.; *Chicago, Ill.; Cleveland, Ohio; Dayton, Ohio; *Detroit, Mich.; Kansas City, Mo.; *Los Angeles, Calif.; Milwaukee, Wisc.; *Minneapolis, Minnesota; *Newark, N. J.; Philadelphia, Pa.; San Francisco, California; *St. Louis, Mo.

INDUCTION REGULATORS

require practically no maintenance



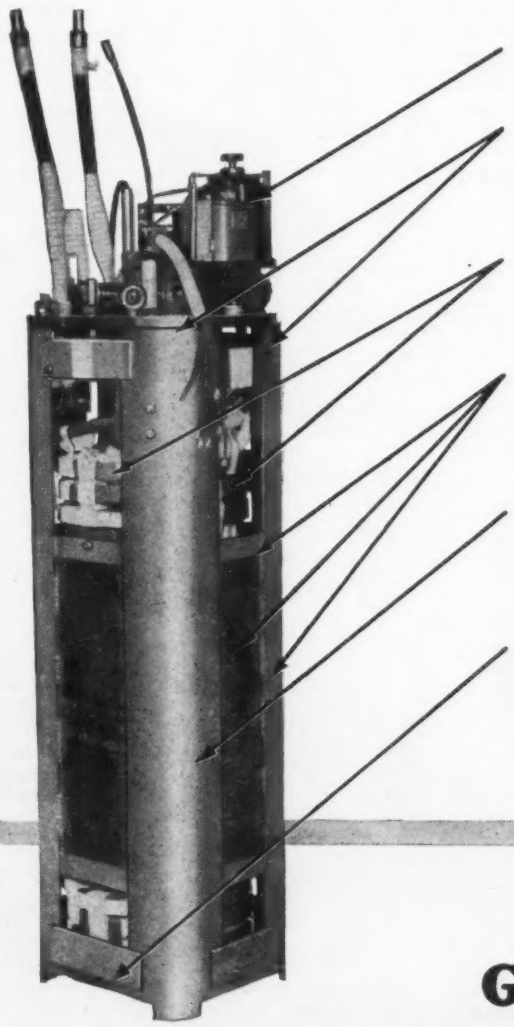
Long-life features of these G-E regulators combine to give you highest return from line voltage stabilization with practically no maintenance cost.

MAINTENANCE of a G-E Type IRS induction voltage regulator is very low. Long-term utility records show that it is almost non-existent. This is the type of regulator you can install and forget about except for routine inspections.†

Add these maintenance savings to those that result from a G-E induction regulator's prompt response to voltage changes, and you have a regulator that *produces a high return* on the investment.

Other benefits are: higher-quality service to customers, prevention of loss of revenue from low voltage, savings from reduced necessity for adding new feeder capacity. They all add up as dollars and cents earnings when G-E induction regulators are used!

Send for Bulletin GEA-2985, *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*



Capacitor Type Motor is easily accessible.

Accurately Machined rabbet joint of top stator plate assures permanent concentric alignment of the rotor and stator cores.

***Herkolite** reinforcing rings prevent distortion of the coils from over-current stresses.

Laminations of the Stator Core are compressed and welded to an all steel frame contributing to continued quiet operation.

Stator Frame, thoroughly braced at top and bottom, is welded into a single unit providing strength and rigidity to whole assembly.

Stator Bottom Plate is machined with a rabbet fit to assure correct centering of bearing cup for the rotor.

†We have recently been asked to rebuild one of our induction regulators which has been in continual operation for more than 40 years!

*Trade-mark Reg. U. S. Pat. Off.

GENERAL ELECTRIC

The New Home of Lloyd PRODUCTS

Lloyd appreciates the patience and forbearance you have shown when overloaded manufacturing facilities slowed down delivery of Lloyd Flex-Loc Lamp Holders and Lloyd Automatic Starters. We are now at home in this large modern plant, where greatly increased facilities will make possible greater service to all our customers . . . service which we hope will match in quality the matchless Flex-Loc Lamp Holders and Lloyd Automatic Starters.

LLOYD POLICY INSURES QUALITY

651-F
FLEX-LOC Lamp Holder

Automatically self-adjusting. Engineered to fit ALL STANDARD spacings. POSITIVE AUTOMATIC LOCK. PERFECT ELECTRICAL CONTACT. Brass contacts grip BOTH sides of lamp pins securely.

Listed and Approved by Underwriters' Lab., Inc., and Canadian Standards Assoc., App. Division E.T.L. Test Report 314454 Available

Patented—Other patents pending.

FS-40
AUTOMATIC Starter

CUTS OUT deactivated or flickering lamps. CUTS OUT current to lamp and ballast. Increases life of lamp and ballast.

Listed and Approved by Underwriters' Lab., Inc.

Certified by E.T.L., Spec. 6
Pat. Nos. 2200443-2228210

LLOYD PRODUCTS CO.

PROVIDENCE 5 RHODE ISLAND

FRANK H. BRAN CO.
400 E. 3rd St., Los Angeles

W. G. BRUCE CO.
2028 S.W. Yamhill St., Portland, Ore.

FRANK H. BRAN CO.
894 Folsom St., San Francisco

HARVEY M. OLMSTEAD
1534 Warren St., Denver

WILLIAM H. SANDERLIN, 129 First Ave., Seattle

Wheel Balancer (821)

An electronic wheel balancer for one-man operation is offered by Stewart-Warner Corp. This unit is said to correct both kinetic and dynamic unbalance without removing wheels from car. Vibration set up by unbalance is picked up by a unit under the axle, transmitting impulse to an electronic amplifying device. A dial reading indicates the degree of unbalance and actuates a stroboscopic light which indicates point of unbalance. Corrective weights are applied to correct unbalance. This unit operates on 110 volts a-c.

Heating Coil (822)

For high-frequency induction heating, Induction Heating Corp. has developed a flexible lead and coil setup, which it claims gives somewhat the same flexibility as that of the soldering iron or oxyacetylene torch. The heating coil is mounted on a grip type handle and is connected to a standard thermonic output transformer by specially designed flexible leads. The coil is suitable for both heat treating and brazing, according to the manufacturer, and may be either single- or multi-turn.

Connectors (823)

A new line of split bolt connectors introduced by Ideal Industries is available in two types: one piece and two piece with small and large heads. They are made in bronze, brass and aluminum in a range of sizes to accommodate all solid and stranded wire from No. 6 to 1,000,000 CM. Ideal also has a new line of service entrance connectors made from cold drawn copper with screws of Everdur. These are made in five sizes from No. 12 solid or No. 10 stranded to No. 2 stranded.

Weatherproof Socket (824)

Eagle Electric Mfg. Co. is making a new bakelite weatherproof socket. This socket is equipped with leads of No. 14 type R wire, single conductor, stranded and tinned, with ends stripped one inch. Space where the lead-in wires enter the socket body and between the screwshell and socket body is filled with heat resisting wax.

Interference Filters (825)

Solar is offering three new radio interference filters for fluorescent lamps. These filters are of two types: a balanced twin-pi filter for maximum attenuation and a delta capacitor filter for normal usage. The former is available as Solar Type EF-100; the latter as Solar Types EF-101 and EF-102 in "bathtub" and cylindrical metal housings.

F Lamp Capacitors (826)

Cornell-Dubilier has a new line of fluorescent lamp capacitors known as types KS, Ky and KZ. These capacitors are said to have stable operation at ambient temperatures up to 70°C, to have low operating temperature, low power factor, dual capacity combinations for cold cathode applications.

Time Switch (827)

An improved poultry house lighting time switch announced by Paragon Electric Co. has a dimmer feature which allows hens to get to roost before the lights are turned out. The switch has a Telechron motor; lists at $12.75.

EVERY BREEZE...
the VIBRANT FORCE
that causes FATIGUE
on OVERHEAD LINE

TO COUNTERACT *VIBRATION* INSTALL HUBBARD STOCKBRIDGE DAMPERS

The simplest means of correcting the destructive force of incipient vibration on overhead conductors is found in Hubbard Stockbridge Vibration Dampers. Installed a measured distance from the insulator ties, at each end of the conductor span, these resilient dampers absorb the force set up by low velocity winds and undulating air currents, thus preventing the build-up of amplitude. They are readily installed with hot line tools without service interruptions or disturbing existing suspension or dead-end clamps. For complete details write for your copy of Bulletin 22 *today*.

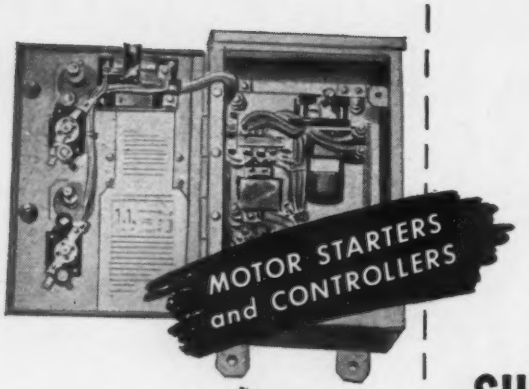
HUBBARD

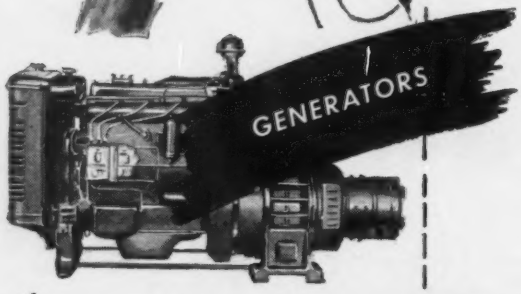
Hubbard and COMPANY

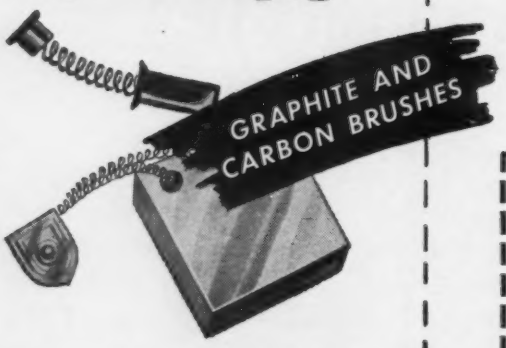
OAKLAND, CAL. PITTSBURGH CHICAGO

HUBBARD

MAKE THE LOAD ON HUBBARD HARDWARE







AVAILABLE NOW!

AT REDUCED PRICES

SURPLUS ELECTRICAL EQUIPMENT

Electrical equipment and material in large quantities are now available in many locations throughout the country. Complete information may be obtained from the nearest Regional Office of the War Assets Administration.

Included in this war surplus inventory are hundreds of items of standard and special equipment—pole-line hardware, wire and cable, motors, switch gear, wiring devices, power-conversion and sub-station equipment. The special items in many cases can be adapted or converted to your needs. *Priced to sell*, these items will help solve the electrical supply problems of manufacturers, industrial contractors, wholesalers and dealers—investigate today.

1 **MOTOR STARTERS AND CONTROLLERS** — General Electric, Westinghouse, Cutler-Hammer, Ward Leonard and other makes, built to both commercial and Navy specifications. 115 and 230 volt d-c; 220 and 440 volt a-c., 60-cycle, 3 phase, drip proof, waterproof, manual and magnetic types. Unused and used. Substantial savings.

2 **Pole-Line HARDWARE**—Insulators, pins and nearly all other items of pole line hardware for transmission, distribution and communications lines. Well-known makes, meeting exacting Government specifications, new, in excellent condition.

3 **GENERATORS**—Engine driven, 100 kw., single bearing, 120/240 volt d-c., 1200 rpm. commercial and industrial types. Unused and in good condition. Many other sizes—gasoline, diesel, steam and electrically driven, and generators without prime movers, a-c and d-c. Check our large lists.

4 **Graphite and Carbon BRUSHES**—Large quantities of new brushes of well-known makes, in a wide range of sizes, in both standard and special types for motors, generators and other rotating electrical machinery.

Although this material has been previously offered to priority claimants 10% of the merchandise has been reserved to fill any further needs of priority claimants, including Veterans of World War II, who are invited to contact the Regional Office serving their Area with respect to this material.

(CUT OUT AND SEND TO THE NEAREST WAA OFFICE LISTED BELOW)

War Assets Administration: I am interested in the following checked items:

WIRE & CABLE	WIRING DEVICES
GENERATORS	POWER-CONVERSION EQUIPMENT
SWITCH GEAR	SUB-STATION EQUIPMENT
SPECIAL ELECTRIC MOTORS	PROTECTIVE EQUIPMENT

Name.....Tel. No.....

Firm.....

Address.....

City.....State.....

319-3

EXPORTERS: Most surplus property is available to the export market. Merchandise in short supply is withheld from export and if such items appear in this advertisement, they will be so identified by an asterisk.

WAR ASSETS ADMINISTRATION

Offices located at: Atlanta • Birmingham • Boston • Charlotte • Chicago • Cincinnati • Cleveland • Dallas Denver • Detroit • Fort Worth • Helena • Houston • Jacksonville • Kansas City, Mo. • Little Rock • Los Angeles Louisville • Minneapolis • Nashville • New Orleans • New York • Oklahoma City • Omaha • Philadelphia Portland, Ore. • Richmond • St. Louis • Salt Lake City • San Antonio • San Francisco • Seattle • Spokane

Just Say...

CENTRAL RIGID STEEL CONDUIT

...when you call your distributor and you'll be sure of getting quality that can't be beat.

"There's Tested Strength in Every Length"

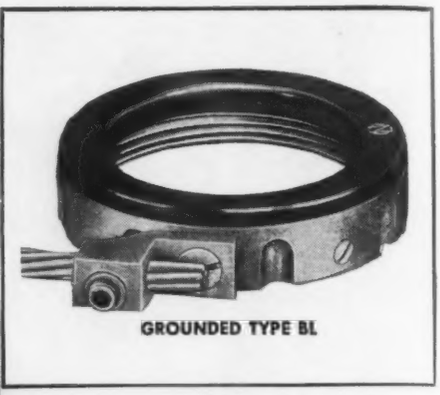
SPANG-CHALFANT

Division of The National Supply Company

General Sales Office: Grant Building, Pittsburgh 30, Pa.

District Offices and Sales Representatives in Principal Cities

INSULATED BUSHINGS



GROUNDED TYPE BL

they're OK

SET-SCREW TYPE SB

if they're O.Z.

CONDUIT TYPE B

Bakelite molded into a cadmium plated, malleable iron base—provides the O.Z. Insulated Bushing with those extra features you want.

The high insulation characteristics of the bakelite guarantees no vibration shorts, while at the same time the strength of the malleable iron base permits tightening the bushing all the way down on the conduit without stripping the bushing threads. Further, the deep metal base of the bushing insures that a Junction Box is secured and correctly grounded to the conduit without the use of an inside locknut. Last but not least, all O.Z. bushings are capped to prevent dust and water accumulation in the conduit prior to pulling cable.

With electrical wholesalers handling the complete O.Z. line, you can get O.Z. products right off your local supplier's shelves—without waiting. Call him now.

O.Z. ELECTRICAL MANUFACTURING COMPANY

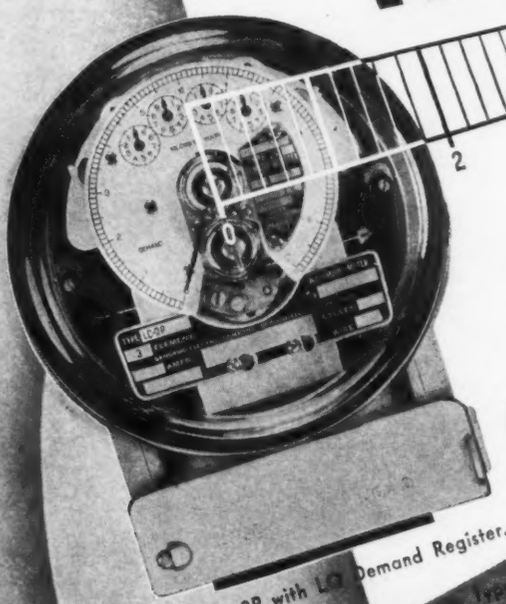
262 BOND STREET · BROOKLYN 2, N. Y.

CONDUIT FITTINGS • CABLE TERMINATORS
CAST IRON BOXES • SOLDERLESS CONNECTORS
GROUNDING DEVICES • POWER CONNECTORS

1585

Measured DEMAND

CAN HELP IMPROVE LOAD FACTOR

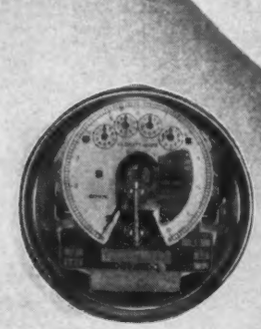


Type LC-2P with LG Demand Register.

Sangamo Type LC-2P [illegible] Type LG Demand Register provides for measurement of kilowatt hours and kilowatt demand where a simple and compact unit is required.

SANGAMO
DEMAND INSTRUMENTS

BETTER load factors are the key to lower average power costs. Improvement can best be realized if the rate structure is such that the customer will be induced to lower his own average kilowatt hour cost through longer hours of use of his equipment. A low price for kilowatt hours which is made possible through a measured demand charge encourages longer hours use. The Sangamo JG and LG Demand Registers are applicable to watthour meters both for singlephase and polyphase. They provide an inexpensive and accurate method of measuring Kilowatt Demand. An extensive line of Sangamo Demand Instruments is available for your particular needs.



Type JS with JG Demand Register.

Type WDP, 4-Wire Delta.

Sangamo Type JS Meter with JG Demand Register for measurement of singlephase kilowatt hours and kilowatt demand. Sangamo Lincoln-Type WDP, separate meter to measure kilowatt demand on polyphase circuit.

SANGAMO
ELECTRIC COMPANY
SPRINGFIELD • ILLINOIS

Sav-U-time

"TOUCH BUTTON" *Control for*

GAS WATER HEATERS

THE PRODUCT: Sav-U-time provides push button control for side arm gas water heaters, from bathroom, kitchen or laundry.

THE ADVANTAGES: Hot water at the touch of a button. No stair climbing, no match lighting. Heater only in use when hot water is needed. All the conveniences of automatic hot water heat with gas savings up to 50%.

THE MARKET: Two out of every three homes in your community have side arm gas water heaters. Here is a practically untouched market—all eager for the simple, inexpensive, Sav-U-time.

THE PRICE: You sell Sav-U-time for $39.50 plus a small installation charge—with 100% profit for you. It's a price that every home can afford.

IMMEDIATE DELIVERY: Here is a wanted item that you sell, deliver, and collect your profit now.

DEALERSHIPS AVAILABLE: Cut yourself in on this profitable business. Take a tip from dealers in St. Louis, Detroit, Philadelphia—who are cleaning up with Sav-U-time. Many territories still open. National advertising, dealer helps back you up. Write or wire for details *NOW*.

SAV-U-TIME SALES COMPANY

81 Manhattan St., Rochester 2, N. Y.

BULLETINS

data books, etc.

Electronic Tubes (828)

Titled "The Business Man's Guide to Electronics," a 28-page Westinghouse booklet explains the fundamental functions of electronic tubes. Among applications described are induction and dielectric heating for tin plating and brazing; molding and curing plywood and heating rayon cord; electronic control for welding; electronic regulators for mixing and packaging; power conversion in mills, mines, factories and railroads; safety devices using photoelectric tubes; measuring and inspecting with such devices as the mass spectrometer, dynetric balancer and the electrigage.

Transformers (829)

Power circuit transformers are the subject of Bulletin 461 PCT, issued by Jefferson Electric Co. Wiring diagrams and mounting suggestions are included. A table gives dimensions and data on double- and single-wound auto type transformers .100 to 10 kva. for reducing from 575-, 460- and 230-volt primary to 230 and 115 volts. A method for determining transformer capacity requirements is explained.

Relays (830)

Potter & Brumfield Sales Co. has published a new catalogue of its line of standard relays and electrical timing devices. This catalogue contains 24 pages, is illustrated and gives data on applications, selection and capacities for each model.

Control Equipment (831)

Ohio Brass is distributing a four-page folder on its safety and control equipment.

Compound (832)

In a four-page folder, General Electric describes its new plastics compound used in manufacture of sealing caps and sleeves. The caps and sleeves were designed primarily to protect the tubes in refrigerator condenser systems during the manufacturing process, are water resistant and have good electrical properties. They are shipped dry and are swelled by soaking in a special dilator solution.

Light for Sales (833)

Number three in the Westinghouse "Know How" lighting series is a guide to profitable merchandising. It gives ideas for the display and sale of lamps, dealing with both store and window displays, and ends with selling sentences to promote lamp sales and quantity sales.

Mycalex (834)

Listing properties and available types of mycalex and telling where and how to order the material, a 24-page booklet on this mica and glass product has been published by General Electric Co. Among information in the booklet is a properties chart listing six grades of mycalex of both the compression and injection molded types.

House Heating (835)

Electromode Corp. discusses electrical house heating in a 20-page illustrated booklet.

Symbols (836)

Pennsylvania Transformer Co. is distributing an information sheet containing symbols used in designation of voltage ratings of transformer windings. These symbols, condensed into half a catalogue sheet, are taken from NEMA standards, Publication No. 42-73.

F Light for Homes (837)

In a 24-page booklet, "Fluorescent Lighting in Your Own Home," Sylvania Electric Products, Inc., answers commonly asked questions about this light source and pictures its line of fixtures.

Temperature Controls (838)

Bulletin D4-2 published by Wheelco Instruments Co. describes the Multronic Capacitrol, newest development in the company's series of electronic temperature controls. Contains applications, operating data and installation diagrams.

ELECTRICAL WEST, 68 Post St., San Francisco 4, California
Please send me information about following CIRCLED items:

800	801	802	803	804	805	806	807	808	809	810
811	812	813	814	815	816	817	818	819	820	821
822	823	824	825	826	827	828	829	830	831	832
833	834	835	836	837	838					

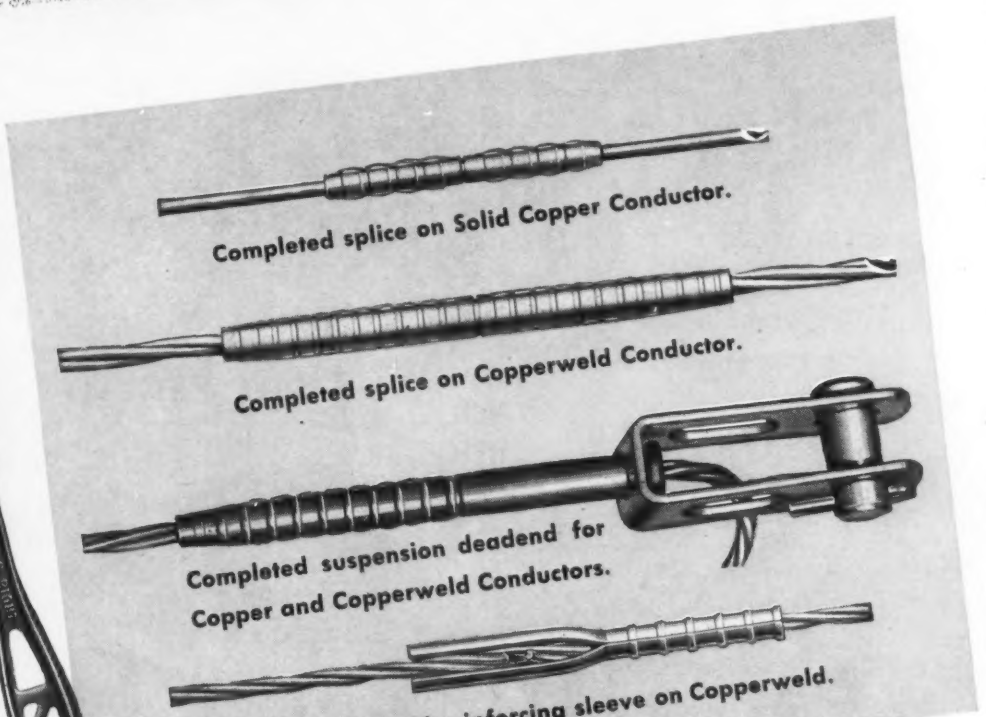
Name..... Company*..... Title*.....

Address.....

* Please include your company's name and your position, as we cannot ask manufacturers to furnish literature unless you do.

"JOB PROVEN" THE WORLD OVER Nicopress

Illustration of No. 51 type Nicopress tool with P. & J. Grooves.



Completed splice on Solid Copper Conductor.

Completed splice on Copperweld Conductor.

Completed suspension deadend for Copper and Copperweld Conductors.

Partially completed reinforcing sleeve on Copperweld.

Nicopress sleeves and tools are available in a complete range of sizes for Copper, Copperweld-Copper, A. C. S. R. and Steel Conductors.

The National Telephone Supply Company

5100 SUPERIOR AVENUE • CLEVELAND 3, OHIO

Canadian Mfr.—N. SLATER CO., LTD., HAMILTON, ONT., CANADA

Export Distributor—INTERNATIONAL STANDARD ELECTRIC CORP., NEW YORK, N. Y.

Cole Electric Co.

1510 So. Los Angeles St. Los Angeles (15), Calif.

PRospect 2068

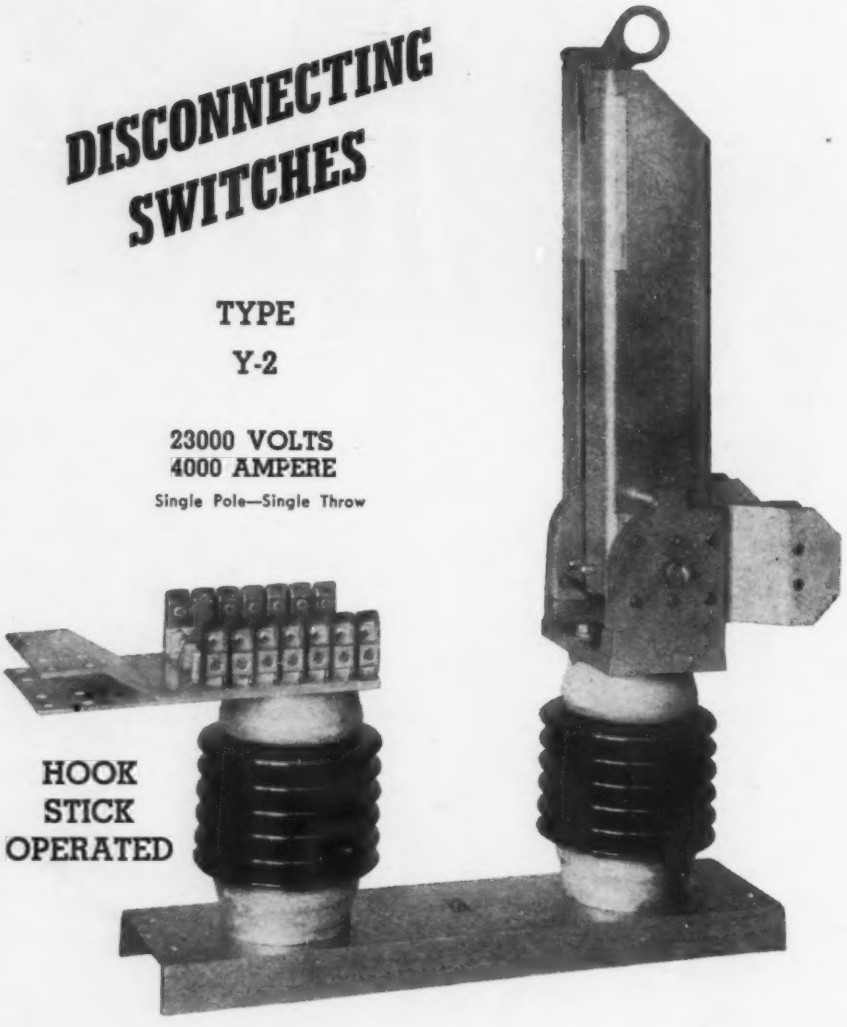
DISCONNECTING SWITCHES

TYPE

Y-2

23000 VOLTS
4000 AMPERE

Single Pole—Single Throw



HOOK STICK OPERATED

CLIP END CONTACT

Pressed Copper Shoes
Silver to Silver Contact
Self Aligning
Short Current Path
Individual Stainless Steel Springs
Terminals 1¾" Drilling

HINGE END CONTACT

Silver to Silver
Pressure maintained by Individual Spring Washers
Terminals 1¾" Drilling

BLADES

Hard Drawn Copper Channel
Bearing Yoke at Hinge End
Large Pull-Out ring
Leverage pryout

BLADES STOPS

Standard Equipment

BLADE LOCKS

Standard Equipment

BASES

Hot Dip Galvanized
Drilled to specification

RATINGS

400 to 6000 Amperes
7500 to 161,000 Volts

Power Plant Equipment

AIR BREAK SWITCHES MANUALLY OPERATED
AIR BREAK SWITCHES MOTOR OPERATED
DISCONNECTING SWITCHES
BUS AND CABLE FITTINGS
BUS AND CABLE SUPPORTS
FUSE MOUNTINGS, FUSES
SWITCHBOARDS
INDUCTION RELAYS

Pacific Coast Representatives

EICHER & BRATT
Colman Bldg.
Seattle (4), Washington
Eliot-2722

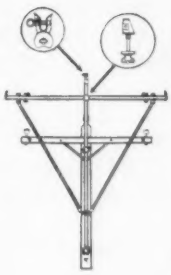
EARL S. CONDON CO.
357 So. Hill St.
Los Angeles (13), Calif.
MI-2831

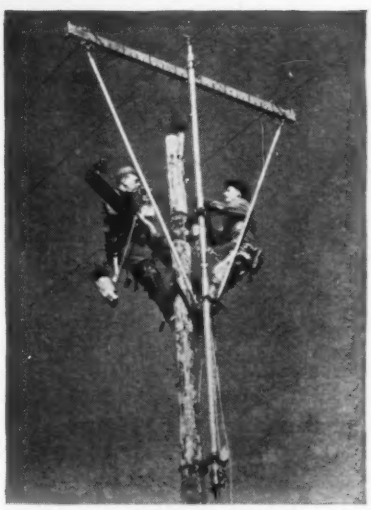
Make Hot Line Repairs in Safety with CHANCE (TIPS) TOOLS

This set of interchangeable hot line maintenance tools has been designed especially for protection to linemen replacing damaged poles, cross arms or insulators on one, two, or three phase rural lines. It can be used in many ways, on ridge pin or cross arm construction, to do a variety of repair jobs without interrupting service. The auxiliary arm can be used as a side arm or as a lifting arm, to hoist conductors into the clear, as at right or hold them aside. As a side arm it is used in combination with the wire tongs as shown in the illustration below.

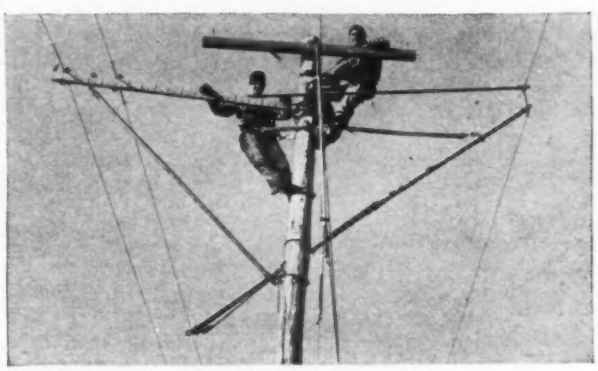
All poles in the set are tested to withstand 75,000 volts per foot and all fittings are designed to operate with complete safety to the linemen.

The set may be purchased complete with tie sticks, wire cutters, bag, etc., as shown, or one tool at a time. Other Tips tool sets or individual tools are also obtainable for dead end or straight line work up to 230 K. V.

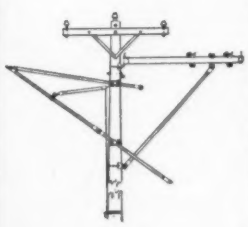




Hot conductors are lifted as a unit to clear the way for safe removal of a defective cross arm.



Conductors are held at a safe distance on either side while damaged insulators are removed and replaced



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ELECTRA'S HUSBAND

The Art of Not Working

"YOU can't make people work as long as they are subsidized to take 20-week vacations," our guest from southern California said as he settled back into a comfortable chair in the living room. Electra had been complaining about the difficulty of getting any kind of household help and had asked our friend his opinion as to the causes for the shortage.

"Take the case of one of the utility companies down in our territory," our guest continued. "They are cutting out an average of about two hundred meters a month because some of their customers can't or just won't pay their electric and gas bills. Just the other day they gave a shut-off order to a service man and he went out to handle the call. The customer—a man—was pretty mad. He didn't think it was fair to cut off service from a person who was unemployed. He said so in no uncertain terms.

"This elicited a question from the service man as to just what particular skills the unemployed individual possessed. It turned out that he was an electrician.

" 'Listen buddy,' the service man told him. 'Come on with me down to our place and you can go to work this afternoon. We're looking for twenty fellows like you.'

" 'Naw, I don't like your kind of work,' " the unemployed chap said. 'It's too hard. Too much running around. I'm going to draw my unemployment pay 'til the aircraft plant gets running full blast again. This is a good vacation. I can go fishing every day.'

"You see," our guest continued, "there are too many people who are just a little bit 'tired' or who won't go back to work until they get a job that will pay them as much as the long-overtime war jobs did. And also there just isn't any concerted attempt by the U. S. Employment Service to see that they work."

"Yes and a whole lot of folks are setting their own qualifications with the USES," I said. "Most of the $40-a-week stenographers list themselves as $300-a-month 'executive secretaries' and won't even consider anything less. The California Manufacturers' Assn. has been doing a lot of investigating of unemployment racketeering and the USES and some of the things they have discovered really smell. They tell of a case of a $200 bookkeeper-stenographer who had been drawing ten weeks of unemployment benefit and who refused to take the one job referred to her in that time. Yet during the ten weeks there were 1,350 individual advertisements for bookkeepers or stenographers or combinations in just one of the newspapers in her territory. These ads ranged from no salary quoted to $250 a month or better."

"That's nothing," Electra cut in, "I talked to a girl the other day who wanted to leave her job and go back to Illinois on a long trip to visit her folks. She checked to find out what would happen if she applied for unemployment insurance while she was gone. They told her at USES they would give her a courtesy card which she could have stamped at the office in the town she intended to visit. The local office would then hold her benefit checks for her until she came home. When she wanted to know if they couldn't send the checks to her, she was told that this could be worked out if she intended visiting. It might take four or five weeks to have this done, but it could be arranged."

"Let me repeat an observation made by the California Manufacturers' Assn.," our guest said. "It is their feeling after much study that the USES operations are so inefficient that they actually encourage the lazy few to vacation at the wage earner's expense. This inefficiency takes two main forms. In the first place the USES applicant, to all intents and purposes, decides for himself whether he is qualified for a job opening. If the applicant doesn't want to work, all he has to do each week is refuse to admit that the jobs to which USES could refer are suitable. "Secondly, even the willing jobseeker is penalized under this system of self-qualification or self-disqualification. Workers can easily misrepresent themselves to the USES as skilled in jobs for which they have no ability whatsoever. The USES harries perplexed employers with applicants who are a waste of everybody's time. This device of mass referrals of unqualified applicants has a more sinister use, however, than just so-called mistakes by USES placement experts. Whenever USES needs to justify its alleged value, it resorts to the device of mass referrals regardless of the qualifications and quickly gets its tax-paid press agents busy misinforming the public about how busy it is. Or it seems to use the system of mass referrals regardless of qualifications to build up statistics showing how many applicants USES must refer in order to make each placement. Its press agents then alibi the inefficiency of USES by charging that employers are too 'picky' —that employers want a $20,000-a-year man for a $1,200 job."

"It just doesn't make sense," I commented. "But then I guess that's how democracy has to work."

"Democracy nothing—you mean bureaucracy," Electra said, ending all further discussion.

LIVING in the Far West has its whimsicalities as well as its advantages. This is borne out by the attitude of many non-Westerners toward the region. Electra is filled with anecdotes about Eastern ineptitude but none can match the experience recited by a resident of Honolulu about which I told her recently. This Hawaiian—a 25-year transplant, incidentally, from the continental West Coast—was chiding me because an Eastern contemporary of this magazine had published news about his own Honolulu enterprise under the heading of "Foreign Developments."

"But that was nothing really bad," he said. "Take the case of one of our large Hawaiian electrical distributors. The head of the firm wrote to a certain Atlantic seaboard manufacturer of electrical appliances in an endeavor to obtain distribution of his products for the Hawaiian Islands. The manufacturer was interested but replied that it would be necessary to conduct all business through an export house.

"The Hawaiian business man replied that such a procedure wasn't at all necessary, that all dealings could be handled direct. His arguments availed him nothing. Further correspondence simply settled the fact that if business was to be done, it would be through a certain export house. The Hawaiian agreed.

Then he received the shock of his life. The first letter from the export house arrived but he couldn't read it. It was carefully written in precise *Spanish*."

OVERHEAD CABLE DISTRIBUTION

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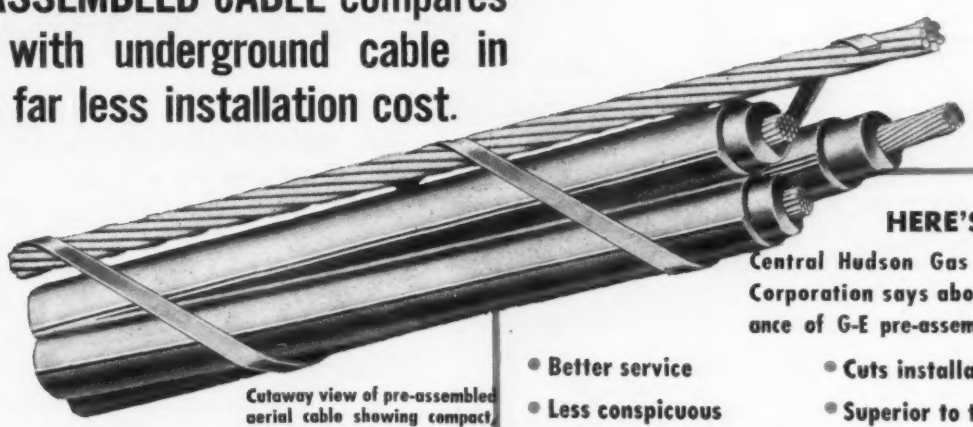

Cutaway view of pre-assembled aerial cable showing compact, all-in-one-unit construction.

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- Less conspicuous
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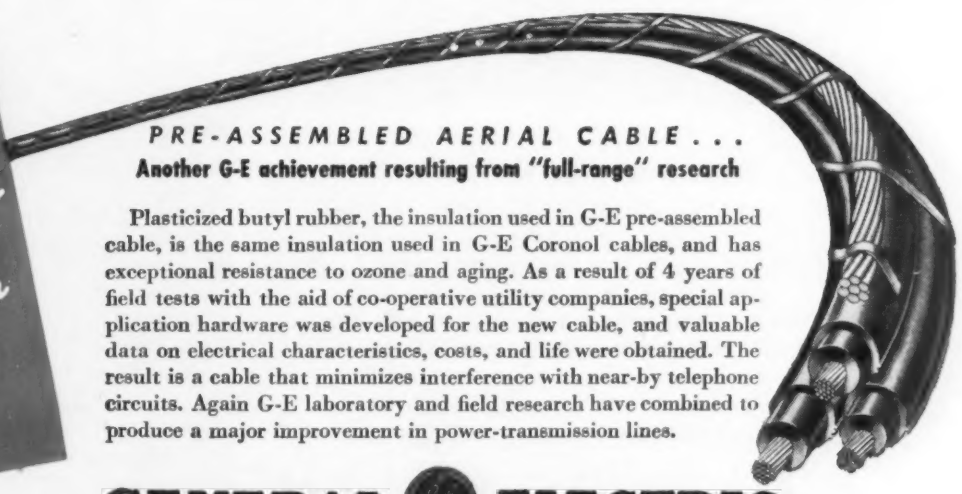

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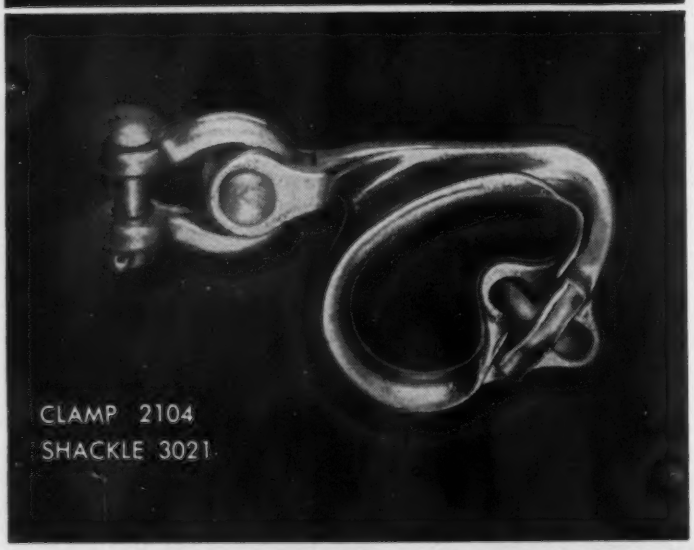
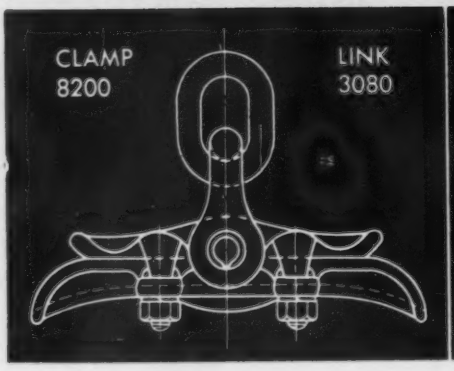
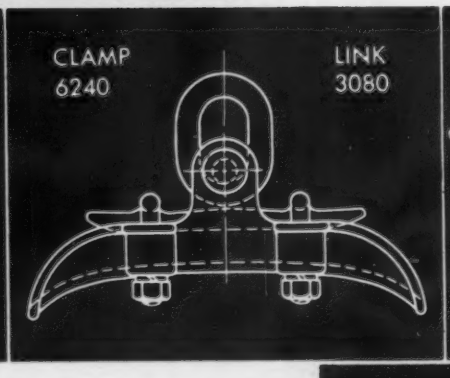


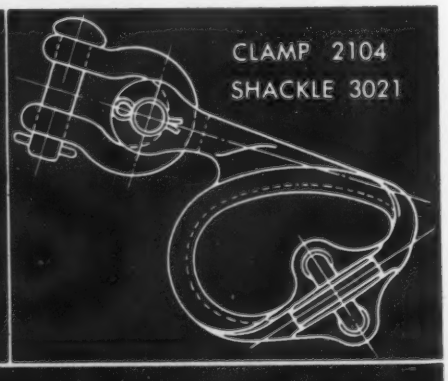
For suspension, two standard clamp designs are offered. Envelope Type No. 6200 Series, generally supplied with U-Bolts for maximum cable-holding-power.

Trunnion Type No. 8200 Series—Designed to minimize the factors causing cable vibration failure—Trunnion bearing is at cable center line —Light in weight, the major part of the assembly mass is concentrated near the center of oscillation, effecting a low moment of inertia—Minimum of loose parts and ease of field installation. U-Bolts are forged integral with the clamping keeper, to which the supporting bail, with Connecting Link or Shackle, is factory-assembled.

Both Clamps develop ample ultimate and cable-holding-strength and have adequate cable-supporting length.







For dead-ending, two standard Strain Clamps are available. Side-opening Snubbing Type No. 2104, generally supplied with heat-treated body for added strength, is adequate for light to medium duty construction. Trunnion Type No. 5050 with ribbed-seat body and keeper, heat-treated, is suitable for cables generally used on heavier construction.

To effect desirable flexibility, the use of a standard Link or Shackle or both, between the Clamp and the structure, is recommended.

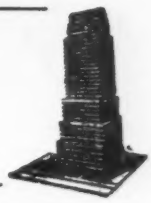
Sold only through your insulator manufacturer

THE BREWER-TITCHENER CORPORATION

CORTLAND, NEW YORK

ELECTRICAL WEST

AUGUST, 1946
VOL. 97 NO. 2



MARKETING POWER FROM FEDERAL PROJECTS

Ralph Carr
Attorney at Law, Denver
Former Governor of Colorado

THE marketing of power developed at government dams is a business which is fraught with a public interest. This statement is not, however, to be narrowed to its legal usage and understanding. The policy which determines the manner in which power is distributed, sold and carried to consumers throughout the country, in city and town, in farming sections and remote mountain areas where mining enterprises are located, in factory and in the household, will go far in influencing the American way of life through many decades to come.

Whether they represent the government, or work for private utilities, whether they buy power to turn factory wheels or merely purchase it to run their milking machines or to grind their grain, Americans of whatever business will be affected by the rules which are finally determined upon.

The magnitude of the marketing problem can be determined by a glance at the existing power development and the plans which are proposed to further and enlarge power production. About 15 million kw. of the country's total power capacity of 50 million kw., is water power. About 40 hydro projects with a capacity of 4½ million kw. are operated by government agencies now. As far as can be estimated, about 175 government projects with a total capacity of about 14 million kw. are planned. More than half of the plants needed for this work are either under construction or else have already been authorized.

We understand further that additions to these projects and supplementary plants will develop another 7 million kw. This excludes government steam generating plants either existing or proposed. Thus, we have, in addition to about 4½ million kw. already being developed, a fixed program for 21 million more and certain expansion to follow. These figures do not include water projects for irrigation districts, municipalities and state agencies.

The complicated considerations which have led to the predominance of federal agencies in the development of the country's remaining water power have little real bearing upon the problem of *how the power, once developed, should be marketed.* The principal direct connection is the understandable, human ambition of the promoters of the federal power projects to expand their jobs to cover the marketing also. There has been, and apparently there still is, a strong drive by government agencies to build extensive transmission and distribution facilities, largely duplicating existing facilites, and to confine the sale of power, so far as they can, to particular classes of users. It is claimed, but I believe, incorrectly, that such a policy is called for, or at least permitted, by certain recent legislation.

May we examine briefly the broad aspects of this marketing problem. These dams and power generation facilities are being built by government agencies with taxpayers' money—money taken directly from taxes or else borrowed—for the repayment of which, principal and interest, the taxpayers are responsible. The investment risk is the risk of the taxpayers, and the losses, if any there are, will be borne by those same taxpayers. It is a certainty that some of the projects will not pay out, even on the low rate of interest which the government can secure with credit backed by the national taxing power.

Taxpayers are widespread. It seems fundamental that the benefits of this use of taxpayers' funds should, in turn, be given as widespread distribution as it is practicable to attain.

The cost of power from a multi-purpose project is, of course, largely a matter of arbitrary allocation of joint costs. Within wide limits the price to be charged for the power can be whatever the administrators see fit to make it. Often, through the simple method of allocating large portions of the total investment in a project to such items as flood control, navigation and similar activities, the apparent power development can be rendered lower than is real.

In setting up justification for a multi-purpose development it is usually represented that the power will be priced somewhat below the cost of power from alternative types of power development, and, hence, that public benefits will accrue in the form of lower rates to power users. Consequently, it is asserted, more liberal use of power will result. Sometimes, especially in regions of high fuel cost, the low-priced power output from a project is represented as essential to the industrial development needed to build up a prosperous over-all economy in that region.

This background of use of taxpayers' money at taxpayers' risk emphasizes the obligation, in simple equity, whether recognized by those engaged in the spending or not, to follow a marketing policy of such a nature that the potential benefits to individual power users and the incentives to new industrial development will be as widely distributed as possible. This point is emphasized now since it is fundamental in solving the whole problem.

Marketing of hydro power involves two controlling phases, *first*, the firming up, by use of steam or other means, of the irregular supply of hydro power from government dams; and *second*, the delivery of the power over transmission and distribution facilities to points of use.

The firming up of hydro power, always a major problem, is especially difficult in cases of multi-purpose dams. With single-purpose power developments the reservoir storage is used so far as it goes simply to equalize river flow and to stabilize power output. In the case of dams for impounding irrigating water, or for regulating navigation facilities, however, the water releases and the development of power are dictated, limited, and determined mainly by unpredictable seasonal irrigation requirements and navigation needs. And these controlling factors by no means correspond to power needs. In the case of flood-control dams, much of the reservoir capacity must be kept empty and hence is useless for storing water through dry seasons to assure irrigation and equalize power output. As a consequence, the available power output from true multi-purpose dams is highly variable as between seasons, and, as between wet and dry years.

Firming Seasonal Power

Most of the power available from multi-purpose dams is only part of the raw material from which commercially usable power can be made. Unless a major part of the potential water power at a dam is to be wasted, the seasonal power deficiencies and the dry year deficiencies must be made up from supplementary sources. Except in the northwest, where fuel is very expensive and conditions are unusually favorable for developing hydro plants with large storage reservoirs, the supplementary source is usually steam.

If the government power is to be marketed through the facilities of existing power systems, there should be close coordination in the operation of the new government generating facilities and of the existing privately owned generating facilities. Where, as will usually be the case, the existing systems have steam plants or single-purpose storage hydro plants with aggregate capacity as large as, or larger than, the government hydro, this firming can be done by off-peak use of the existing steam plants, or, by changing the seasonal schedules of the storage hydro plants. The result will be that little, if anything, in the way of additional generating facilities will be required to firm a reasonable proportion of the erratic power output of the government dams.

On the other hand, if the government dams are to be operated largely independently, with separate transmission systems and separate markets, additional facilities must be installed to supplement the hydro in dry seasons and dry years. Such additional facilities, whether steam or single-purpose storage hydro, will not be needed during periods of good river flow or high river flow and will represent a direct duplication of investment in generating facilities. If, as would be true in most cases, the firming of independently operated government hydro plants were done with steam, the steam capacity required would amount probably to one-third or one-half of the hydro capacity. This is definitely a wasteful duplication which could be avoided by pooling the government hydro plants with existing plants. A further saving would arise from avoidance of transmission facilities for connecting the government steam plants.

Illustrating this, the output of the government's Colorado River plants, Hoover and Parker, has been firmed by large amounts of steam capacity in the Los Angeles area and in Arizona. The output of the Bonneville and Coulee plants on the Columbia River was largely firmed during the war by coordinated operation with the single-purpose storage hydro plants and steam plants of the adjoining privately owned and municipally owned utility systems. While the TVA output on the Tennessee River was firmed by a combination of its own steam plants, equal to 25% of its hydro capacity, special storage developments and heavy purchases of off-peak steam from adjoining utility systems were also needed.

Area Economics

The other phase of marketing power from government dams, that of delivery to points of use, also brings up important issues of engineering economics. Points of use are widely scattered. Sources of hydro power necessarily are concentrated. Sometimes they are remote. Power is delivered from generating stations to points of use by a branching network of transmission circuits, distribution circuits and substations. The cost of this network of facilities depends in part of course upon the amount of power to be delivered and upon the distances from the power sources. But also it depends in large part upon the service area to be covered. Since a major part of transmission and distribution cost is for area coverage, it follows that two systems delivering the same aggregate amount of power over the same area must cost much more than a single system capable of doing the whole job.

Facilities for transmitting and distributing power are expensive. As a countrywide average their cost is more than one and a half times the cost of generation facilities. Even in hydro systems the transmission and distribution facilities usually cost more than the power plants.

It seems clear then, that the marketing of power from government dams costs less if done through the facilities of existing systems than if done independently, in whole or part, through government owned facilities or through facilities of quasi-public local agencies sponsored by the government. While such independent facilities might be subsidized by risk-free money and substantial exemption from taxation, the basic economies effected through coordination of existing systems are so large as to assure lower final costs. In addition tax revenues would be preserved.

Other economic benefits are also to be expected from marketing this power through organizations with adequate resources of engineering and technical skill, far-sighted management and acumen and experience in selling the benefits to be secured from more extensive use of electric service. Such an organization is usually an essential part of every established utility company. Years of experience and training have made this almost the basis of the industry. A local government organization may not have it. And a local quasi-public system, such as a public utility district, can scarcely be expected to have it.

Let us now return to the question of obtaining both economical and wide distribution of this government produced power. In the basic legislation this purpose is clear. For instance, in the Flood Control Act of 1944, the policy as to disposal is "in such manner as to encourage the *most widespread* use thereof at the lowest possible rates to consumers consistent with sound business principles." This declaration of underlying policy emphasizes widespread use and economy of cost, both of which are securable only through coordination.

Flood Control Act

There is, however, a detailed provision in the Flood Control Act of 1944, and earlier in the TVA, Bonneville and Fort Peck Acts, which in some degree appears inconsistent with this policy in that a preference is given, as to use of power from government dams, to public bodies and cooperatives. Even if we grant that this constitutes a preference only as to availability of power, and not as to price, it is difficult to comprehend the reasoning underlying such a provision.

As has been heretofore asserted, the benefits derived from this power are paid for and supported by the taxpayers—meaning directly and indirectly all of the people. In fairness, there seems to be no reason why the government, in dispensing benefits so created, should give first choice to a group of power users, who, either by their mere selection, or else by the ac-

cident of location, are permitted to purchase their power service from a public body or a cooperative organization, in discrimination against other users less happily located, and therefore forced to purchase their power service from a private business enterprise. The provision is unfortunate also in that it is being used as an excuse for government building of independent transmission facilities and steam stations, otherwise unnecessary, in order that service may be delivered directly to the preference classes.

It is to be hoped that when the significance of this provision becomes more widely understood, it will be repealed. After all the consumers under private utilities are citizens and taxpayers. The approach to the problem from their standpoint is seldom attempted.

While we have been told, as a defense of this provision, that it was written to assure that benefits gained from the use of public funds would go to consumers and not to the stockholders of power companies, I cannot accept that defense as being offered in good faith. Electric utilities, because of the nature of their business and facilities, are subject to the strictest regulation by local authorities, usually state utility commissions. We all know from wide observation that present day utility commissions are diligent and alert. To say that they are not competent to enforce a requirement that any benefits from government produced power marketed over existing systems shall be passed on to consumers is a wholly unwarranted attack on such utility commissions and on state administrations generally.

Power to Spare

But in most cases this provision, inequitable and unwise though it is, need not have much practical bearing on the question of what facilities are to be used for marketing the power. So long as the provision remains in the law, government officials quite properly will endeavor to enforce it. Usually, in a region where government dams are being built, there will be substantially more government power available than existing public bodies and cooperatives can use or may wish to use; hence, after their needs are met some of the power will usually be left over for distribution to other power users. Responsible government officials have recently disclaimed any intention to proselyte in favor of additional public agencies and cooperatives in the power utility field. As to the preference classes there remains only the problem of delivering the power to them. As to the remainder of the government power and the presumed savings therefrom, they should be distributed as widely as practicable among other power users.

The government power can be delivered most economically to these preference classes, as well as to other power users, by making a maximum practicable use of the facilities of existing systems. Independent operation, with duplication of facilities and loss of operating coordination can more than wipe out all of the presumed savings, even for the preference classes of users. From the viewpoint of our subject, it may be immaterial who provides the direct connections to new dams, but it is highly material that there be no unnecessary duplication of existing transmission facilities and that new transmission facilities be coordinated in planning and in operating with existing facilities.

Sale of government generated power over existing facilities to the preference classes might be carried out by establishing resale rates which are sufficiently above firm power bus bar rates to cover adequate delivery costs and losses, or it might be carried out by other arrangements. We know that such other arrangements have undesirable aspects and that they are discriminatory as against other power users. However, they would seem to constitute a lesser evil than the wasteful duplication of facilities set up to permit direct service to these preference classes, should government administrators consider such duplication a necessary or permissible alternative under applicable laws. It would seem, however, both inequitable and inexpedient to enter into such an arrangement with respect to any other power users than the preference classes under federal statutes. Except where necessary to comply with federal laws, such arrangements in some cases might constitute discrimination under state laws.

With respect to the general subject of preferred classes of power users, I may refer parenthetically to my belief that special terms may properly be given to rural electrification projects—not because the ultimate users are members of cooperatives—but because they are farmers. Improvement of living conditions and increase in working efficiency in farming areas is a matter of concern to the public generally and to residents of adjacent nonfarm areas in particular. This preference now accorded to cooperatives under the federal acts is not, however, at all necessary to securing special benefits for rural electrification. Utility companies are now making both retail and wholesale rates for rural service on what approaches an increment out-of-pocket basis. These rates are lower than for comparable service to other types of customers, and utility commissions generally are approving and encouraging such rates.

We have heard the claim that the federal government must protect its water power investments by the ownership of the transmission lines from the dams to market centers, even at the expense of increased costs to users, because, otherwise, the government will in the future be at the mercy of the owners of these transmission lines. The argument is not convincing. Congress has ample power to protect against such hold-up tactics, should they ever threaten.

Which Course?

The alternative to the use of the facilities of existing systems is either more government owned, or else more government-sponsored and subsidized, transmission and distribution systems, with these systems gradually taking over the whole power load both preference-class and other.

Government encroachment and subsidized competition in this field, with continuing adverse propaganda and political attacks against utility companies, constitute a direct threat to the future of private enterprise in the electric utility business. General supersession of private enterprise in utility service in the regions where government dams are now being located would all too rapidly spread to the remainder of the country.

It is difficult to believe that the Congress intended to force or encourage uneconomic and wasteful methods of marketing the power developed at the dams for which it has appropriated funds. Surely the Congress does not approve of any plan to turn this power into a device which will destroy private enterprise in the electric utility field. I fear there has been, in the recent past, too much reason for suspecting that the language of the statutes is being distorted to establish excuses for deliberate evasion of cooperation.

What we should soon see is the pleasing spectacle of all government agencies having jurisdiction taking the lead in bringing together the utility companies, the municipal power systems, the state power systems and the REA's into a fully cooperative program so as to assure full and effective utilization of the power developed to avoid duplication and waste, to provide adequate facilities for the most widespread distribution of power from all sources to all types of users, to reduce power costs, to encourage and assist increasing power use, and, generally, to make electric service a powerful agent for the welfare of every region served.

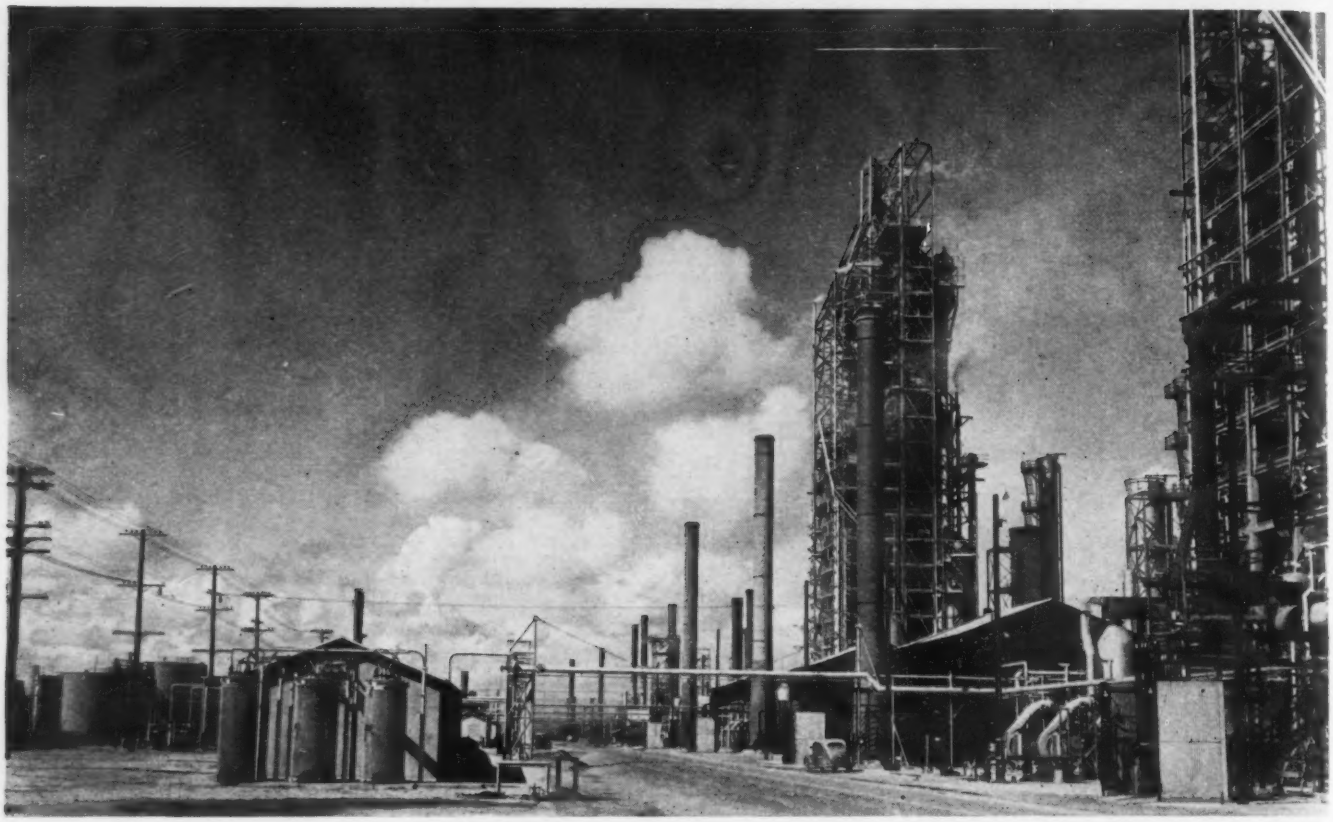


Fig. 1—This road separates refining area, right, from normal area, left; in latter are switch house and sub, foreground

Pioneering in Electrical Design

Torrance Refinery wins dividends from a far-seeing expansion program in which growth of plant and growth of electrical facilities were planned as a coordinated unit

Roy B. Bryant and *F. M. Dorey*

General Petroleum Corp.
Torrance, Calif.

General Electric Co.
Los Angeles, Calif.

ABUNDANT evidence of what can be accomplished by adherance to a well-conceived plan, in which electrical design is coordinated with an over-all program for expansion of an industrial plant, is to be found at Torrance Refinery of the General Petroleum Corp. Torrance Refinery was started from scratch in 1929, about the time when 500 hp. or so was considered a good refinery load. Since then the refinery has grown to its present connected load in excess of 13,000 hp. Coherence of the electrical system has been maintained throughout the period of growth, and in many instances the plant benefited years ahead of time by electrical practices which subsequently became standard in industry at large.

Starting out as a straight run distillation unit, the plant had the advantage of plenty of room—900 acres—in which to expand without crowding. Progressive addition of units has brought the plant up to its present capacity for turning out all types of fuels and gasoline up to 100 octane rating.

Basic to the electrical design was the decision to develop the plant in refining and normal sections, the plant at its eventual size being then envisioned as a coordinated whole. By following this plan, Torrance Refinery was able to compromise one of the dilemmas which plagues electrical designers at refineries: whether to put explosion-proof equipment in refining areas or use standard equipment and keep it out of refining areas. Also avoided was the expense of reshuffling electrical equipment, a move which becomes necessary when normal areas are allowed to become refining through "haphazard" additions of equipment.

The Torrance program set up definite zones separated by roadways. In the normal zones, where such elements of the plant as boilers, utilities, shops and electrical switch houses are situated, standard general-purpose electrical equipment is used. This leaves only a limited quantity of equipment essential to the refining zones and hence of explosion-proof design.

Power Distribution

Power is fed to Torrance Refinery by Southern California Edison Co. via two 16.5-kv. feeders, normally operating in parallel but each capable of carrying the full plant load. The plant distribution system (Fig. 2), although laid out in 1929, is remarkably similar to the load-center scheme which is the recognized practice of today. Substations strategically situated with respect

to refining units, and located in the normal zones of the refinery are fed radially at 16.5 kv.

There are nine radial feeders to nine switch houses (with which substations are associated, see Fig. 1). Provision is made, however, for making ties on both the 2,300-volt and 460-volt buses in the switch houses, thus permitting the system to operate as a primary and secondary selective system.

Reliability is thus gained, as any 16,500/2,300-volt transformer bank or associated feeder can be lost without complete interruption to associated load. At present, however, there is not enough capacity throughout the plant to carry the full load in every case, were one bank to be out. To take care of this situation, it is proposed to install a full 2,300-volt network when conditions permit.

Separate, radial operation of each substation does, however, keep the short-circuit requirements at a minimum; approximate short-circuit kva. on one 2,300-volt bus is 43,000 kva. (short-circuit kva. on the 16.5-kv. bus at the switch rack is 125,000 kva.).

Distribution circuits within each of the switch houses are essentially the same (for examples see Fig. 2). Each 16,500/2,300-volt transformer bank is fed underground by cables which are wiped directly into the transformer connections without bushings. The banks are from 1,500- to 3,000-kva. capacity. Secondaries are carried directly to the main disconnects, where the delta connections are closed.

The 460-volt buses are fed directly from 2,300/460-volt polyphase transformer banks varying from 350- to 750-kva. capacity.

Houses

Monolithic concrete is used in the construction of the newer switch houses and process-control houses. The latter are kept free of inflammable materials, and cables and conduits are sealed off at entry, thus preventing them from becoming a point of entry for escaping gas. Control is exercised by remote systems, some electrical and some pneumatic.

This system of control-room construction makes it possible to use controls and instruments which are not explosion resistant and to dismantle equipment in the control room at any time for maintenance. It also makes it virtually impossible to lose control through fire. Savings which come about from the use of standard rather than explosion-resistant construction are frequently large enough in themselves to pay for the remote-control system.

Temperature of the process-control houses is continually maintained at working level, while switch rooms are provided with fin-type electric heaters, thermostatically controlled, for the purpose of preventing sweating during shutdowns in damp weather, by maintaining 100° F. during shutdown.

Motors and Control

Contrary to general practice, practically all motors of 50 hp. and more are operated at 2,300 volts. In general, 2,300-volt motors below 150 or 200 hp. cost more than 460-volt motors of the same horsepower, and 2,300-volt motors require windings of such reduced size that the mechanical strength is sometimes questioned.

Use of the higher voltage in this particular case became practicable because 460-volt banks were thus kept to economical sizes with regard to both current-carrying and interrupting capacities, and because the division of the refinery into the refining and the normal zones made it desirable to locate starters as much as 300 ft. from their associated motors. Thus long runs between motors in the refining zones and their starters back in the switch houses would have led to high costs through the addition of secondary

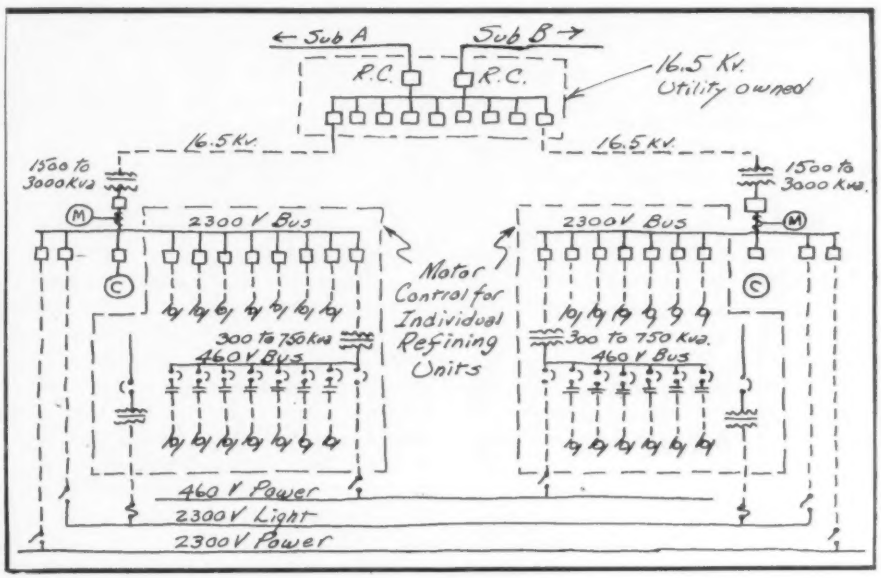
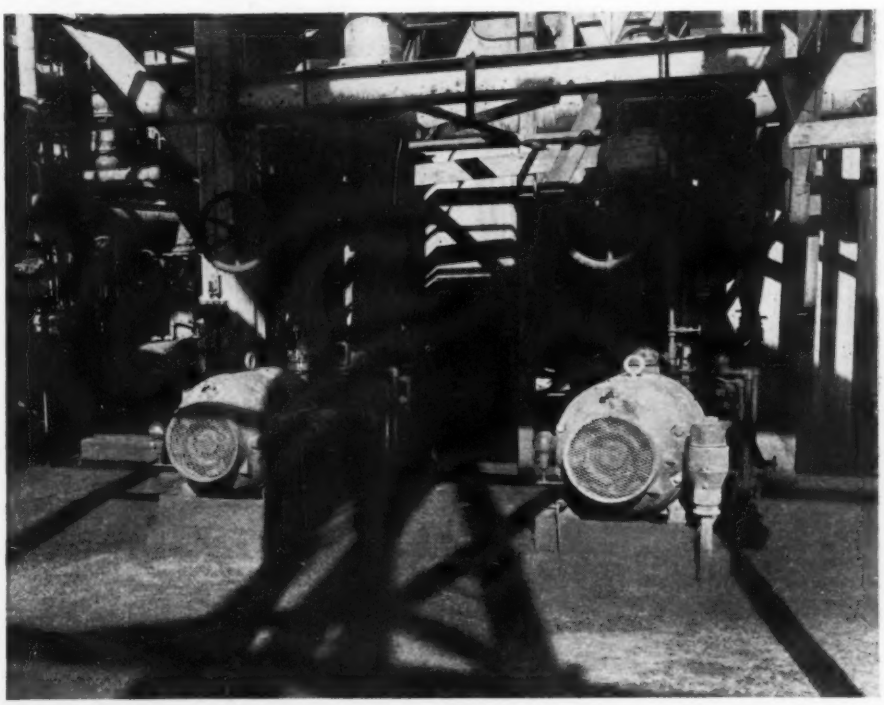


Fig. 2—Distribution plan laid out in 1929 is forerunner of load-center scheme

Fig. 3—Totally enclosed fan-cooled motors driving pumps in the refining area; Control station with push buttons and indicating lights appears on post at left



transformer cost, excessive voltage drop, and consequent requirements for larger cable and conduit—that is, had 460-volt motors been employed.

Push-button controls and indicating lights are mounted near motors in the refining zones (Fig. 3), the starters being in the switch houses. A 12-volt d-c control circuit is employed (see ELECTRICAL WEST, April 1946, p. 89 for diagram and details).

Air circuit breakers are used for switching and protection of all the lighting and 460-volt power circuits; no fuses are used. This virtually eliminates the possibility of single-phase operation and consequent motor burn outs.

Most of the motors are induction, principally because of the cost and difficulty of getting 2-pole synchronous motors in explosion-proof designs. Practically all these induction motors operate continuously at close to full load.

Power factor correction was undertaken following a complete study of operating conditions. Originally, the power factor was running about 80%. So far, 4,200 kva. of capacitors have been added, installations being at the 2,300-volt bus in each switch house. By this correction, about 9½% of the permissible 10% power-factor rebate on power billings has been obtained.

Tunnels and Vaults

Service from the switch houses is by means of underground tunnels to vaults situated under the control houses in the refining areas (Fig. 4). Some tunnels are pressurized with dry filtered air; all tunnels and vaults are ventilated by stacks, convection currents of air from a safe source being set up by the normal heating of the cables.

On one side of a tunnel, 2,300-volt cables are racked-up on top, 460- and 12-volt and lighting circuits beneath. On the other side are carried thermocouple leads, copper tubing for the pneumatic control systems, etc.

Racking in tunnels has demonstrated a number of advantages. Installation of cable is quicker and cheaper. Restoration of service in case of fire or a small flash back is much faster—a burned cable end can be pulled back into the tunnel and spliced; it is not necessary to pull in a complete new cable. The tunnels afford better cooling.

Operation

Feeders or main cable runs and all 2,300-volt motors are protected through induction time overcurrent relays. Since the motors are explosion proof and hence have no appreciable overload service factor, they are protected at 10% above rated amps. Instantaneous trips are set at 10% over the locked rotor current. The trips are checked annually by passing current through the current-transformer primaries, or through the thermal heater strips, where current transformers are not used.

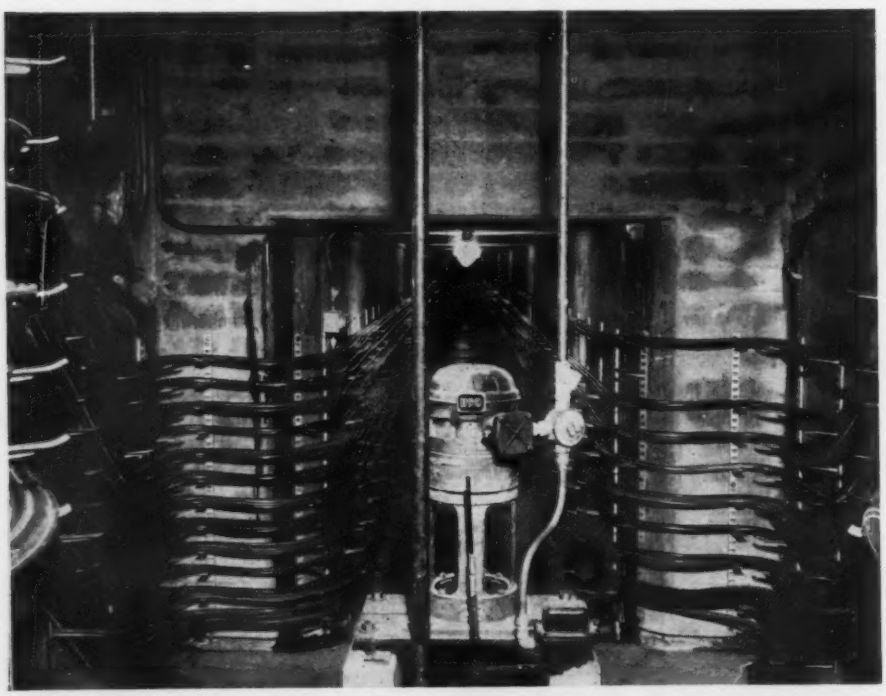
After a shutdown, a motor together with its leads and starter is megged as a unit. Ground-indicating meters on power, battery and pilot-light circuits are read daily and the results recorded.

Motor air passages are cleaned and painted and motors are painted, before the rains start each year. A corrosive-resistant paint is used, and the treatment has been found very effective. As the same time, ball bearings are lubricated by forcing new grease in and allowing the old to run out while the motor is turning. Oil-lubricated motor bearings are checked more frequently.

Substations and switch houses are unattended but are checked on each shift. All operations are recorded.

The record speaks well for both the design and operations. Throughout 16 years there has been no major shutdown through electrical failure. The safety record is excellent. The economies are outstanding and the design as a whole, including many features which were pioneered, conforms with the best practice of today.

Fig. 4—Typical tunnel from switch house to refining area. Some of these tunnels are pressurized. Sump pump in foreground guards against possible water seepage



Hiway Phones

Vehicles moving between Los Angeles and San Diego soon will be utilizing the first highway telephone service in the West, if FCC approves an application filed by American Tel. & Tel.

Plans call for fixed transmitter-receivers on Mt. Wilson and Mt. Woodson, from which the entire 125 mi. between the two cities can be covered. The service will be similar to AT&T's mobile urban service, except that frequency will be between 35 and 44 megacycles (compared with 152-157 megacycles for urban service); mobile units will have a power of 20 watts. Two-way service is provided between any equipped vehicle and any telephone on the Bell system.

Permits for similar systems on two highways out of New York were requested at the same time: N.Y.-Washington and N.Y.-Buffalo. Permits have already been granted for service between New York and Washington and between Chicago and St. Louis.

● BACKING UP J. Elmer Housley, Aluminum Co. of America, newly elected president of the AIEE, will be a board of directors including several Westerners. Newly elected to the board is C. F. Terrell, vice-president of Puget Sound P&L Co., Seattle. Hold-over board members are: F. F. Evenson, consulting engineer, San Diego; L. M. Robertson, transmission and station engineer of Public Service Co. of Colorado, Denver, and Walter C. Smith, Pacific district engineer of General Electric Co., San Francisco.

Fig. 1

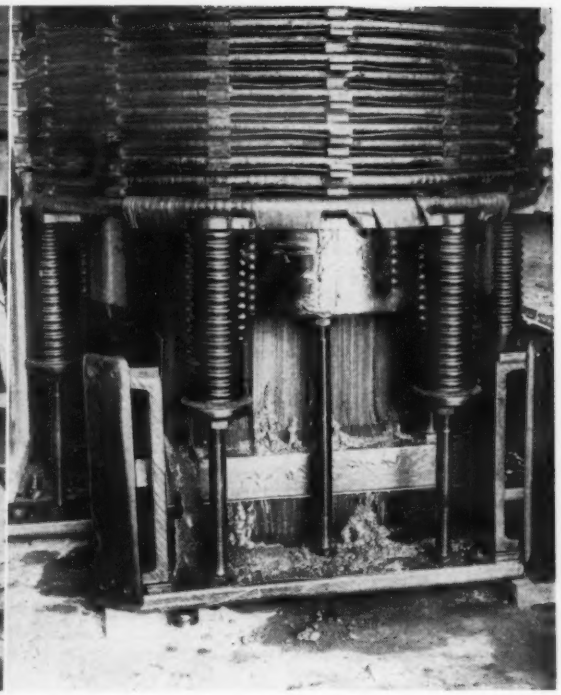


Fig. 2

Rebuilding to the Core Salvages Capacity

Earl T. Meldrim

Supt. of Substations
PG and E Co., Oakland

SINCE iron is normally a very stable material, we think of the core of a transformer as probably its least vulnerable part. However, this is not always true as was illustrated by the recent failure of two 10,000-kva., 3-phase, 95/12-kv. transformers. These were in a group of four similar units which had been in service for more than 30 years in Substation X of the Pacific Gas and Electric Co. in Oakland.

In September 1945, one of these transformers showed a sudden sharp rise in temperature while carrying only a nominal load. It was cut out of service and taken to the General Electric Service Shop in San Francisco where inspection showed conditions of which Fig. 1 is typical—small piles of iron pellets and the bulging of the core iron. Examination showed such extensive burning of iron around the core bolt holes that it was deemed inadvisable to attempt repairs. This decision was reached despite knowledge that the remaining three transformers in this group at the station would be severely taxed during the winter peak loading with its heavy demands upon capacity.

Just at this point, it is interesting to note that when this transformer core was hauled to San Francisco by a local drayage firm on a large multi-wheel trailer, the total weight was within 5,000 lb. of the 112,000-lb. load limit of the San Francisco-Oakland Bay Bridge, and the over-all height was within 6 in. of the maximum permissible.

On September 24, another transformer, at a time when it was carrying only about 2,000 kva. of load, showed a sudden sharp temperature rise, going from 50°C. to 61°C. in less than an hour. It was cut out of service and, upon inspection, its condition was found to be similar to that of the first unit. Fig. 2 shows the typical deformation of core and the accumulation of iron pellets.

Naturally, two failures so close together gave great concern as to the probable condition of the remaining two transformers of this group, and, although this station has another unit rated 25,000 kva., there could be no possibility of carrying the regular winter load without some relief other than that obtainable by transferring as much as possible to other stations.

Thus, although a new transformer large enough to replace the two defective ones was immediately ordered, it was known that delivery would be delayed about one year. As a result there was not much question as to the necessity right then of trying to make one good transformer out of the two bad ones. It was recognized that this rebuilding might cost almost as much as a new unit, but relief was imperative and the job was started.

Since much of the iron in both transformers was badly burned, there was serious question, for a time, as to whether enough could be salvaged to make one good core. Work progressed on a 24-hour basis, seven days per week, with all the men who could be utilized anywhere on the job. Complete disassembly of both the transformers and the unstacking of every individual sheet of iron was necessary. Bad sections were cut out, sheets were rearranged, and new core bolt holes punched where needed.

The oxide coating on the sheets of iron was badly deteriorated and in many places was peeling off or was entirely gone. It was essential, of course, that this oxide coating be replaced and how to do it without building up too much oxide in the places where it was still OK while trying to put some on the places which were entirely bare, constituted one of the major problems of the job. Some experimental work was done and a search was made throughout the bay area for an atmosphere controlled furnace which could do this work.

None was available, however, and the final solution was to prepare a number of heavy sheet metal boxes which were lined with asbestos, loaded with the iron sheets and then covered with asbestos and a good layer of charcoal. Heat treating was done in an ordinary furnace in a local heat treatment plant. This in itself was no small task since there were about 40,000 lb. of iron sheets to be individually loaded into and unloaded from the iron boxes. However, this was all accomplished successfully, and the assembly of a core proceeded without delay. During this assembly, thin asbestos sheets were inserted after every inch of iron in order to minimize the chance of eddy currents should the oxide coating fail at any point.

When the rebuilt transformer was finally ready and was put in service, it was found to operate more quietly and at a lower temperature than the remaining two in the group. Much credit is due the General Electric personnel for their unstinted efforts in getting this unit ready for the winter peak load.

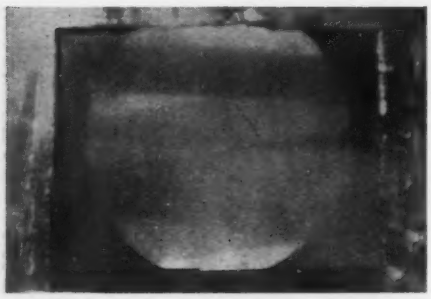


Fig. 1

X-Ray Inspection of Armored Cable

X-RAY as a means of continuously inspecting non-leaded submarine cable after armoring has been successfully applied to some four miles of cable for use by Puget Sound Power & Light Co. Two separate inspections were involved, one by The Okonite Co., which supplied a continuous two-mile length of cable to Puget Sound in May, and the other for the Puget Sound system directly by the Industrial X-Ray Engineers of Seattle, the latter being applied to a spare length which the system had on hand.

The factory shipment was a 23,000-volt cable in which each of the three conductors of 250,000-circ.-mil copper was insulated with an oil base compound, with a monel shielding tape applied over the insulation. Armor was No. 4 BWG copper bearing galvanized steel wires which gave the cable an outside diameter of 3.94 in.

X-ray was applied at the factory as the cable was loaded out and thereby provided a final check on factory splices and proof that no conductor deformation had been introduced. X-ray equipment was situated in an improvised X-ray room through which the cable passed on its way to an overhead capstan above the gondola car into which it was being loaded for shipment to Puget Sound.

The machine was operated at 250 kv. and 10 ma., and was arranged to throw

A True Story — for Inventors Only

HUNDREDS of electrical men who are inventors at heart will get a surge of reborn confidence out of the discovery of electro polishing of silver plate as described in a Westinghouse publicity release. It goes something like this.

Dennis R. Turner, identified in the release as a "youthful physicist in the electronics department of the research laboratories" was going about his business of experimenting with some "dime-size phosphor bronze diaphragms for microwave tubes" when he was privileged to witness a phenomenon which, presumably with the aid of the Westinghouse publicity department, he describes as follows:

"One of the little diaphragms had been suspended in the bath, through which alternating current was passing, by a strand of wire previously used to immerse some object being silver plated. The wire was a dull white in appearance as silver plate always is before being polished, but when the phosphor bronze diaphragm was lifted out of the solution I saw that the piece of wire had taken on a high luster. I immediately realized that here was something the silver industry had been looking for for many years—a method of electro-polishing silver plating."

Here the publicity department inserts the note that "young Turner's discovery of this glittering strand of wire, and his hunch that it might indicate a new way of polishing, started a long, tedious series of experiments and tests." Turner then goes on:

"I finally found that the best product results from immersing the silver plated object in a bath of silver cyanide solution normal to the regular plating operation. Instead of sending negative current through the bath as in plating, however, I apply positive current in about four times the amperage used to plate the metal, but not continuously. The positive energy is applied for a few seconds, discontinued, then sent through again, and this intermittent action repeated for several cycles. When the article has reached its peak of luster, it is taken out of the bath, rinsed and dried, and you have your finished product. The entire operation takes only a little more than a minute."

Turner and his Magic Spoon

The tale concludes with details on the development of automatic controls and predictions as to the revolutionizing of the silver-plating business.

But we lost the homespun inventor several sentences back. The old fire was rekindling in his eyes. If his eyes had seemed a little dull it was because this age of mass-production of inventions tended to give him the idea that without a few billion dollars for equipment (a sum larger than that accumulated by most electrical men) he had little chance of inventing something new. But this story seemed to confirm his old faith —that all he really needed was that old wire kicking around the basement and the facilities of the kitchen sink.

the cable shadow on a fluorescent screen where it could be constantly scrutinized. Cable shadow can be seen in the photograph of the screen, Fig. 1.

Careful car loading was required to make certain that the flaw-free condition of the cable upon arrival at the car was not disturbed. In this operation the factory drew on experience which is standard for shipping long continuous lengths of submarine cable. Being armored with a right-hand twist, the cable was laid in the car counter-clockwise (Fig. 2). This assured slight, uniform loosening of the armor as layers were laid into the car, and restoration to original condition upon unloading.

A 40-ft. car, loaded in this way, results in 360 deg. of twist per 100 ft. of cable in the maximum length loops, and 360 deg. per 60 ft. of length in the inner loops, or an average of around 4 deg. of twist per foot of cable. Bulkheads built into the car facilitate loading and provide protection in shipment. A bridge is provided for carrying the cable to the next car, and the two cars are chained together to prevent accidental uncoupling prior to unloading.

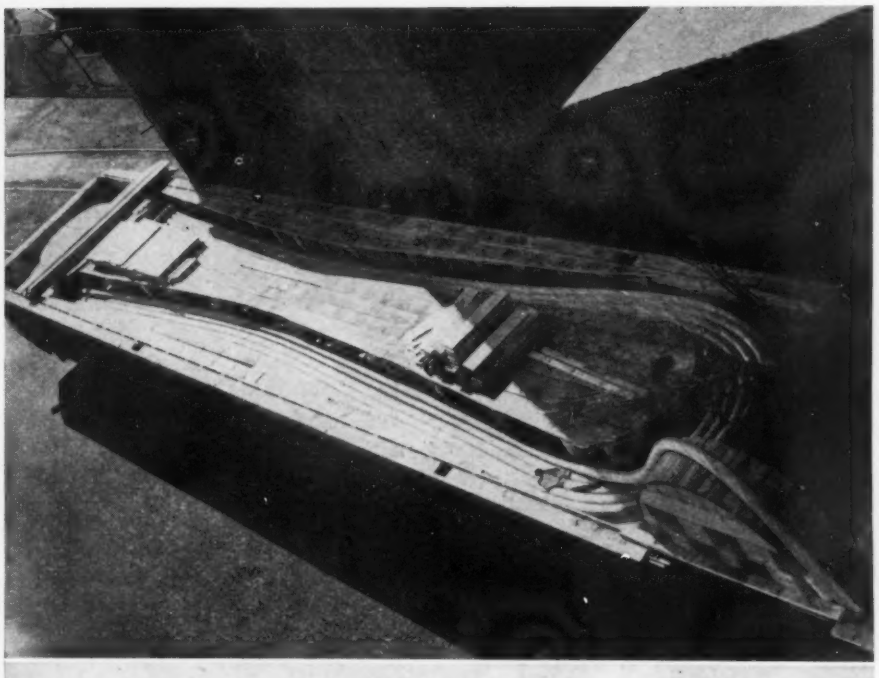
Upon arrival at Puget Sound's Shuffleton power plant, the car to be unloaded was spotted directly under a free-running sheave so the cable could be pulled vertically from the car, down through the winder and into the hold of the cable-laying ship (Fig 3). Within the ship it was laid in the same counter-clockwise fashion as in the car.

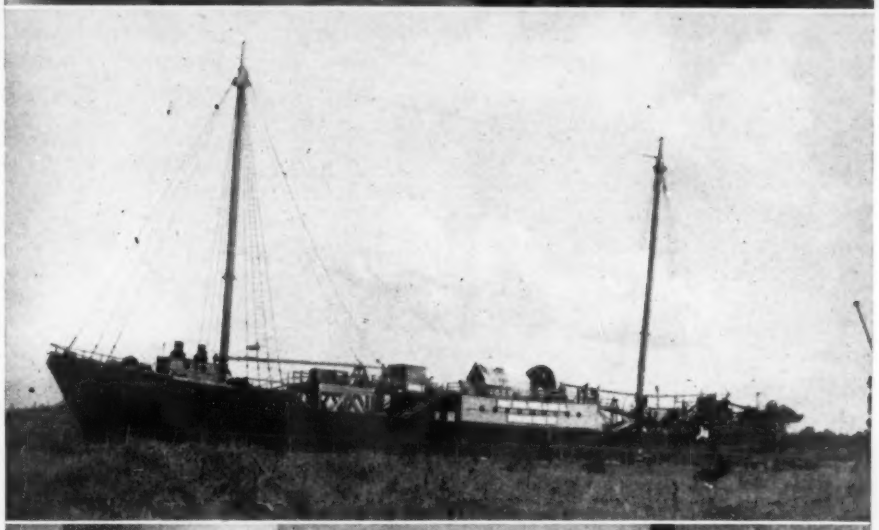
The Puget Sound inspection involved a 12,000-ft. spare length of similar submarine cable which was to be spliced to the new length. Similar continuous inspection was employed (Fig. 4) with the added feature of taking X-ray photographs whenever the shadow of the cable on the fluoroscope was not distinct.

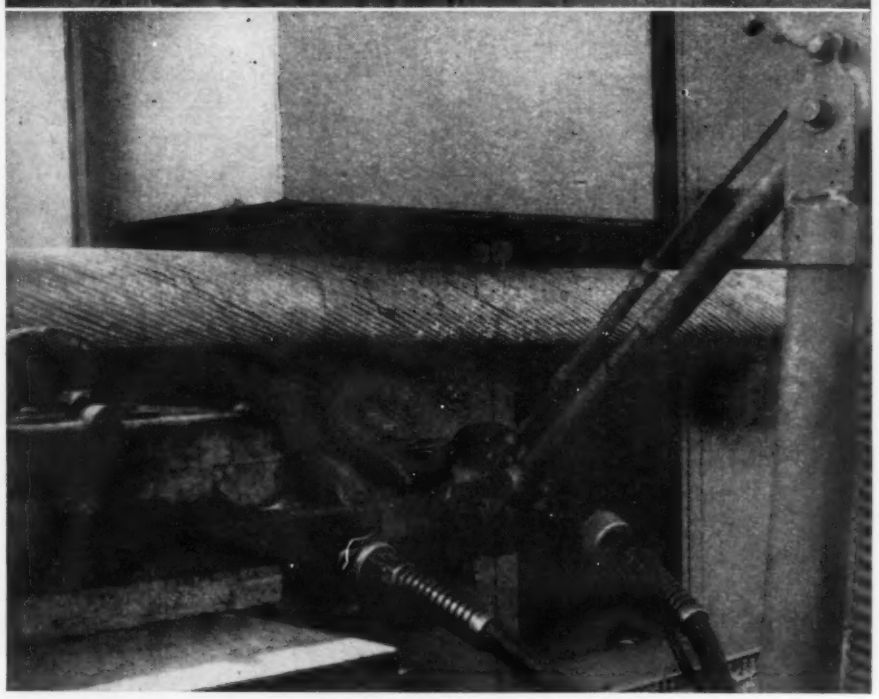
Pictures were taken on Eastman Industrial Type A film with lead screens. A 1-min. exposure was required for each picture at approximately 30-in. distance, using 140 kv. and 10 ma.

In all, more than 20,000 ft. of cable were inspected in the two cases, without discovery of defects in conductors or factory splices. In fact there was such remarkable freedom from imperfections that Okonite ran a series of X-ray tests on artificially damaged samples. These tests confirmed the belief that any imperfections would have appeared on the screens.

This cable, now ready for laying in Western waters to depths of 800 ft., has the distinction of being X-rayed, together with armor, through every foot of its length.







Figures 2, 3, 4

Index to the 1946 Electric Code

A time-saving reference for contractors, wiremen and building and industrial men by which knowledge of the 1940 code can be put to good use in becoming familiar with the forthcoming version

James Moore Evans

THE new Code, the first to be published since 1940, is being printed for distribution in November and December 1946.

It is truly a new Code. Much material has been added and an amazing number of changes have been made in the original sections.

The changes range from the innocuous change of "a" for "the" or "the" for "a", to a complete new paragraph having the same intent as the original. In many paragraphs, the changes are fundamental and vital.

The entire Code must be carefully analyzed by everyone actively using it. Sometimes the change of one word has changed the intent of the rule and only careful study will catch the differences.

In a series of articles in a magazine, it is impossible to print the entire Code with the changes in red. The best that can be done is to give a comparison of the new paragraphs with the old by paragraph numbers. Below are the old paragraph numbers (at left) with the corresponding new numbers to the right.

Later, ELECTRICAL WEST will digest important changes by paragraph number. Thereafter, an attempt will be made to show applications of the new Code with drawings.

These articles should make it easier to get acquainted with the new Code. The following is designed as a permanent cross-index for old and new hands alike.

Chapter 1—General

Article 100—See Box

Par. or Art. No. 1940	Par. or Art. No. 1946
1109	1109
1110	1111
1111	1112
1112	1113
1113	1114
1114	1115
1115	1116
1116	1117
1117	1120

Chapter 2—Wiring Design

2001-2102 incl.	2001-2102 incl.
2103	2101
2104	2111 & 2112
2105	2113
2106	2121(c)2
2107	**Deleted**
2108	2203; note 2115(a); 2116 (a); 2116(b); 2116(c); 2-2116(d) incl.
2109	2115(b)
2110	2124(b)
2111	2123(b)
2111(a) & 2111(b)	**Deleted**
2111(c)	2123(b)
2112	2114
2113	2103
2121-2175 incl.	2115-2127 incl. Completely rewritten
2121	2126(a)
2131	2126(a)
2141	**Deleted**
2151	**Deleted**
2161	2126(c)
2201 & 2202	2201 & 2202
2203	2203
2203(a)	2203(a)
2203(b)	2203(a)
2203(c)	2203(d)
2203(d)	2203(f)
2203(e)	**Deleted**
2204	2203(g)
2205	2204
2206	2205
2301	**Deleted**
2302	2301
2303	2302
2304	2303—**Part deleted**
2305	2304
2306	**Deleted**
2307	2305
2308	2306
2311-2314 incl.	2311-2314 incl.
2321	2321
2322	2324
2323	2323
2324	2322 & 2322(c)
2325	2324 & 2322(b)
2326	2325
2331-2339 incl.	2331-2339 incl.
2351-2351(c) incl.	2351-2351(c) incl.
2351(d)	**Deleted**
2352-2357 incl.	2352-2357 incl.
2358 & 2359	2359 & 2360 respectively
2371-2371(b) incl.	2371-2371(b) incl.
2371(d)	**Deleted**
2372-2375(e) incl.	2372-2375(e) incl.
2381-2392 incl.	2381-2392 incl.
2401-2403 incl.	2401-2403 incl.
2403(a)	2403(a)
2403(b)	2403(d)
2403(c)	2403(e)
2403(d)	2403(f)
2403(e)	2403(g)
2403(f)	2403(h)
2404-2409(b) incl.	2404-2409(b) incl.

Chapter 1—General

Article 100—Definitions

1940	1946
Adjustable-Speed Motor	**Deleted**
New	Askarel
Cable	**Deleted**
New	Communication Circuit
D-C Neutral Grid	**Deleted**
New	Disconnecting Means
Explosion Proof	2nd par. of Section 5001 scope
Exposed	Broken up into two definitions
Factory Yard	**Deleted**
Garage	"Suitable cutoffs" permitted
Garage, Commercial	**Deleted**
Grounding Conductor	**Deleted**
Hazardous Location	Refers to Art. 500
Isolated Plant	**Deleted**
New	Low-Energy Power Ciruit
Motion Picture Studio	**Deleted**
Rating (of fuse)	**Deleted**
Rating (of circuit breaker)	**Deleted**
New	Remote Control Circuit
Secondary Neutral Grid	**Deleted**
Setting (of circuit breaker)	**Latter half deleted**
New	Signal Circuit
System Ground Conductor	**Deleted**
Totally Enclosed Motor	**Deleted**
Waterproof	**Deleted**

2410 & 2411 .....2410 & 2411
2421-2423 incl. ....Deleted
2434-2481 incl. ....2434-2481 incl.
2481(a) .....Deleted
2481(b) to 2481(e) incl. .....2481(b)-2481(e) incl.
2501-2542(b) incl. .2501-2542(b) incl.
2542(c) .....2542(e)
2542(d) .....2542(f)
2542(e) .....2542(g)
2543-2553 incl. ....2543-2553 incl.
2554 2555
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2571 & 2572 .....2571 & 2572
2572(a), (b), (c), 2572(b), (c), (d), (e) (d) ..... respectively
2581-2622 incl. ....2581-2622 incl.
2622(a) .....Deleted
2622(b)-2632(a)2 incl. .....2622(b)-2632(a)2 incl.
2632(a)3 .....Deleted
2632(b)-2822 incl. .2632(b)-2822 incl.
2823 .....Deleted
2824, 2825, 2826, 2823, 2824, 2825, 2826 2827 ..... respectively

Chapter 3—Wiring Methods

3001 3101
3001 note .....3001 note
3002 3001
3003 3002
3004 .....Deleted
3005 3102
3005(a) .....3005(a) and scattered paragraphs
3005(b) .....Deleted
3005(c) .....3005(c)
3005(d) and (e) ..Deleted
3005(f) .....93101(f)
3005(g) .....3102(a) and Table 2, note 6
3006 3107
3007 3103
3008 3105
3009 1118
3010 1117
3011 3006
3012 3736
3013 3011
3014 3007
3015 3008
3016 3009
3017 3010
3018 1119
3019 .....3003(a)
3031 .....Deleted
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3033 3013
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3051 .....Deleted
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3249 .....Deleted
3281-3344 incl. ....3281-3344 incl.
3345-3347 incl. ....3346-3348 respectively
3361-3365 incl. ....3361-3365 incl.
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3370 .....Deleted
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4106 .....4111, 4150, 4163, 4166
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4346 .....Deleted
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4361-4501 incl. ....4361-4501 incl.
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4532 .....4512-4512(c) incl.
4541 4516
4541(a) & (b) ....Deleted
4546 .....Deleted
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4601 & 4602 .....4601 & 4602 respectively
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6021-6112 incl.	6021-6112 incl.
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6141-6241(b) incl.	6141-6241(b) incl.
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94702-1	Deleted

Chapter 10—Tables, Diagrams

Tables 1 & 2	Tables 1 & 2
94702-2 to 11, incl.	94702-1 to 10 incl. respectively
Tables 4 & 5	Tables 4 & 5
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Table 9	Table 9
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Table 11	Table 11
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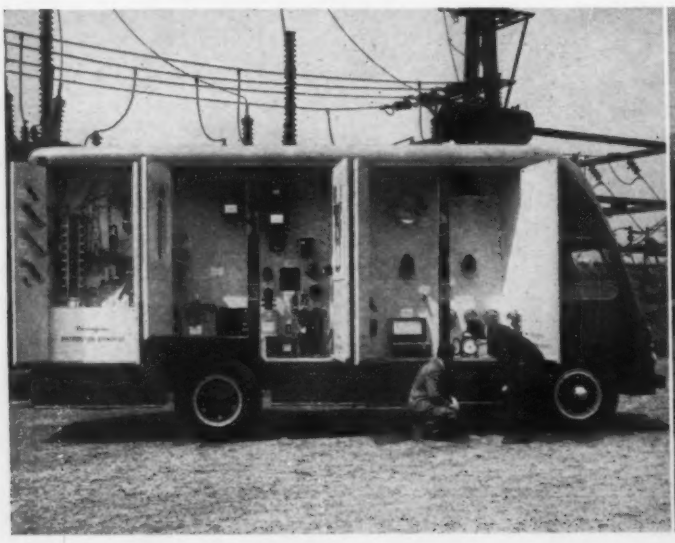
Table 14	Deleted
Tables 15 & 13	Table 13 (combined)
Tables 16-34 incl.	Tables 16-34 incl.
Diagrams, Examples and Appendix	Diagrams, Examples and Appendix

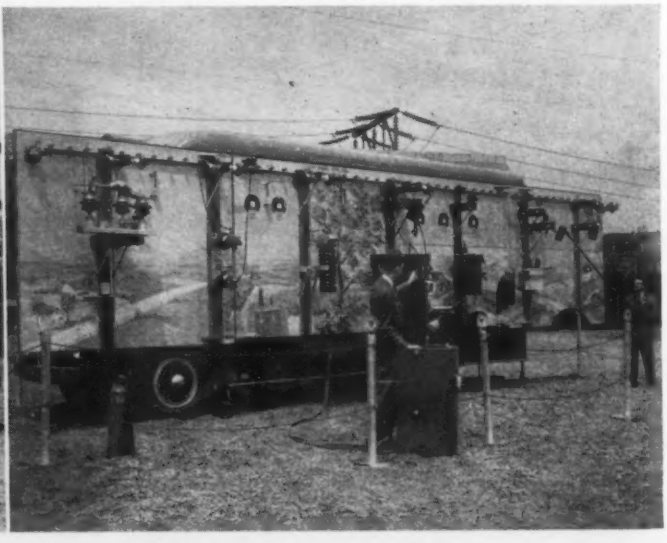
Roving System

SCHEDULED for a tour through the West this year is a truck rigged up by Westinghouse which in effect is 10 mi. of energized distribution circuit and equipment which can be subjected to lightning, swinging branches and assorted other troubles as desired. It is designed for use in a two-hour demonstration at which spectators may see at one glance the performance of all equipment as though operating on the line.

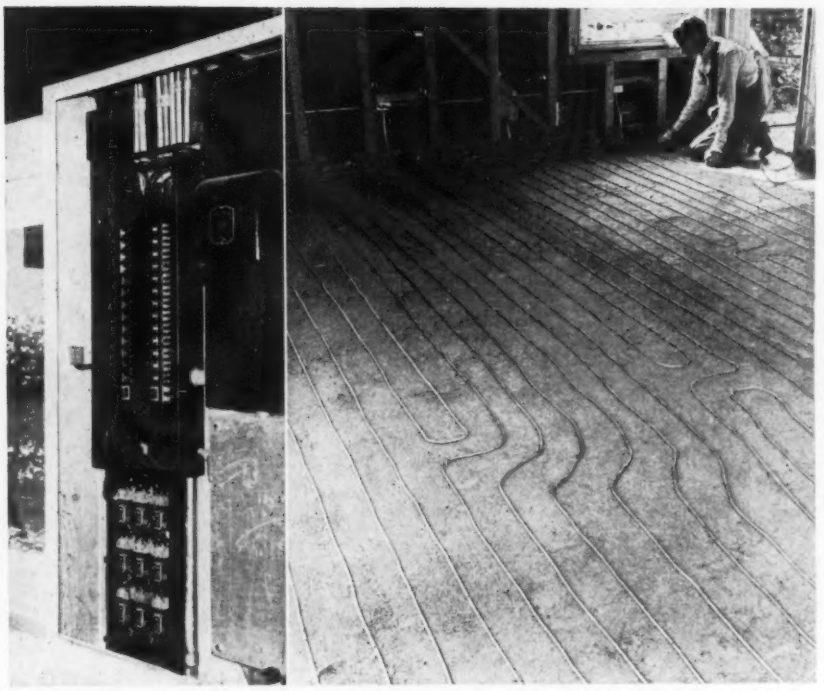
Equipment is presented in normal sequence against a painted background which acts as a reminder that the 35. ft. of display represents 10 mi. of line. Energy is obtained from the nearest 110-volt a-c source capable of supplying 60 amp., and by means of suitable transforming and generating equipment is used to produce 2,400 volts for operation, and 100 k.v. for the lightning effects.

Included are disconnect switches, boric acid fuse, automatic reclosing pole type breaker, step-voltage regulator, completely self-protected distribution transformer, lightning protective devices and primary shunt-connected capacitor.





New Techniques In Radiant Floors



Branch circuit panel, contactors below. Floor pattern keeps proper length

ELECTRICALLY heated floors are being installed in sufficient numbers in southern California to give a real test to this form of electric heating and to provide data much needed by the industry. In the rambling California ranch type of home, built right on the ground, the opportunity to place heating wires in the concrete slab itself makes this experiment practicable.

First of such houses to be completed and put in operation is one of twelve being built by O. R. Angelillo, engineer and contractor, in San Marino, Calif. So enthusiastic is Angelillo that he willingly gives a lecture on the virtues of this type of heating to all who come to visit these houses he has built.

At Fullerton, eight Union Oil Co. employees recently bought a tract of land from the company and each is building an adobe brick house in which the floors will be electrically heated. Another tract of 40 houses is being built at Anaheim by Dr. Burroughs. These, too, will be of adobe and will use electrically heated floors.

While experiments have been going on for several years, these newer applications make use of No. 19 Nichrome wire, covered with a triple braid of Fiberglas insulation and impregnated with silicone varnish. This wire is laid directly in the concrete. Having a very small cross section, the expansion and contraction at the maximum is so small that there is little likelihood that this type of installation will cause checking or cracking of the concrete as it dries out. Angelillo used a soil-heating, lead-covered cable. In subsequent houses, he plans to use the glass-covered wire.

Dry concrete seems to be an excellent insulating medium. The Southern California Edison Co. made up a test slab, 4x6 ft. in size, in which 60 ft. of the No. 19 Nichrome wire was placed on 4-in. centers and allowed to dry for two weeks. It was then operated on both 110 volts and 220 volts, both wet and with the concrete drenched with water. A leakage of only 0.2 amp. was found in the wet concrete, and that was attributed to the water across the terminals. Even in newly poured wet concrete a test failed to indicate any feed-through and the procedure helped to dry out the concrete in one day rather than two.

Earlier Designs

Tripplet & Barton and Stolper Electric Co. of Burbank were experimenting some years back with panels made up of corrugated paper upon which plain iron wire was wound. These panels were embedded in the concrete, to form either a floor slab or wall panel. Such an installation was made at Monogram Studios, under direction of Jules Lytgens, and it is understood some of the panels burned out, probably because carbonization of the corrugated paper when heated provided a carbon path through which the panel shorted out. Lytgens has indicated he will try the new method of embedding Nichrome in concrete, possibly putting it in Fiberglas sleevings.

In the first installation made by Angelillo in a rather large home of 3,600 sq. ft., the electrical contractor cut the No. 19 lead-sheathed cable in 120-ft. lengths to provide 900-watt circuits on 240-volt operation. The wire itself would operate at a maximum of 140° F. It was calculated this would result in slab temperature of no more than 85° even in zero weather. Normally, operation of the slabs would be around 75° to provide full comfort.

The earth was graded, covered with a rock ballast and rolled. A layer of waterproof paper was then put over the ground and the edges of the paper waterproofed to the foundation cement. A layer of vermiculite concrete, 3 in. thick was laid on this foundation. Vermiculite concrete is made by using an aggregate of mica rock; the result is a concrete of excellent insulating qualities, spongy texture and very light weight.

The cable was then placed by the electrical contractor along this vermiculite concrete floor on 4-in. centers. Angelillo chose this spacing simply to keep on the safe side; there were no data from which an exact spacing could be determined in advance. It is now indicated that a 6-in. spacing would be close enough, in a well-built and insulated home. These jobs have not yet gone through a winter, however, so it is too soon to determine whether this is the correct spacing or not.

Either Minneapolis Honeywell or General Controls' thermostats are used.

A finished floor of 1-in. concrete, stone or tile buries the wires and gives the floor surface. Rug pads and rugs, or linoleum are laid over this surface.

The linoleum people have been particularly enthusiastic about this means of heating. One of the problems in the laying of linoleum on concrete floors

has always been that of keeping the concrete dry. If it absorbs moisture, the linoleum has a tendency to buckle. With a dry floor, and electric heating appears to keep it so, very successful linoleum floors may be guaranteed.

As shown in the illustration, the individual circuit of floor heating cable is brought into a stub of electrical metallic tubing and from there to an outlet box for connection to the main feeders. The circuits are brought together at a main circuit-breaker panel which also houses the contactors for energizing the circuits through the operation of the room thermostat.

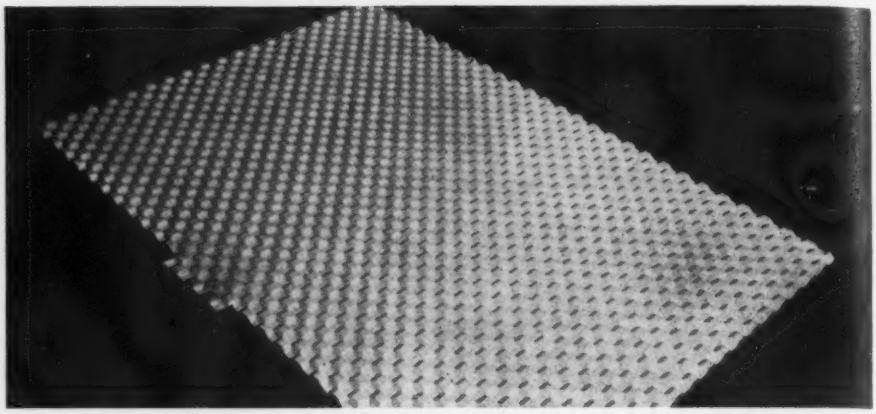
In comparing the cost of this type of heating, Angelillo declared that the installation, including wire and thermostats, costs less than $1,000 for a 3,600-sq. ft. home, whereas the cheapest figures he had for a gas-fired furnace with blowers, etc., including the cost of digging a basement and building a room for the furnace, would have been $2,600; and for a gas- or oil-fired hot water system, $5,200.

As to operating costs, Howard Douglas and Victor Soper of Southern California Edison Co., estimated it would run about $400 per year for 42 kw. of heat, a large range, three water heaters, dishwasher and disposal, 3-hp. pump and the usual quota of appliances and lighting.

In the small houses being built for Dr. Burroughs in Anaheim, Bungalow Electric Co. estimated that the use of the silicone and triple glass braid-covered No. 19 Nichrome wire would cost about 1½c per ft. for the wire as against 5c per ft. for the lead-covered wire, and that the labor would possibly be about the same. In that instance, the wire is to be laid in concrete without the insulating vermiculite base. At the Fullerton homes for the Union Oil Co. employees, because the walls are of abobe brick, the electrical contractor, Selfridge Electric Co. of Fullerton, brought the heating wire into brass waterproof floor outlet boxes through a Fiberglas "spaghetti" sleeve.

Because of the time lag in bringing a large surface up to full operating temperature, it is being recommended that in bathrooms and breakfast rooms where quick heat may be wanted, some direct heaters also be installed, thus creating a market for supplementary heating equipment.

Stub of metallic conduit forms connection from house wiring system to floor



Steel waffles in standard sizes provide wall surface and accommodate heating wire

Radiant Panels

A WAFFLE-SURFACED sheet-metal heating panel is being developed at Hawthorne, Calif., by J. C. Scurlock, a consulting engineer and former aircraft engineering designer. Scurlock is planning to offer panels produced on a production basis of 32-in. width to span two joists, and in 4-, 5- and 6-ft. lengths to take care of various building shapes.

The panels are made of two sheets of the pressed design which, when pressure-welded together, form small channels through which both Fiberglas and silicone insulated wire, No. 19 Nichrome, can be strung. The connected load is 20 watts per sq.ft., although in normal operation, connected to a timing thermostat which would keep the panels energized only one-third of the time, the consumption would be cut 6 or 7 watts per sq.ft. of floor area, or between 18 and 22 B.t.u. per sq.ft. per hr. Made of 26-gage steel, panel weighs 1½ lb. per sq.ft. The normal panel has 7½ sq.ft. of surface area and represents 150 watts of connected load. Operating temperature would be about 88° F.

On a production basis, Scurlock estimates the panels could be produced at about 30c per sq.ft. installed, not including insulation wiring. This cost is, however, about equal to that of the lathe and plaster, which the panels replace. Part of the design is a number of structural members or joists for supporting the panels. The connections come out in ceramic connector blocks with taper fittings for the Nichrome wire connections and asbestos wire, terminating in special aircraft 50-amp. rated T&B slip fittings. Wiring would probably have to be based on the full connected load as would the transformer rating.

In operation with a timing thermostat, the connected load would be on 25% of the time, cycling the temperature beween 75° and 108° F. In selected rooms, such as bedrooms where the heat was only wanted during certain hours of the day or night, manual control could be provided.

A similar steel panel with one plain surface is also being designed for use as a floor panel. Scurlock is submitting samples to Underwriters' Laboratories for testing.

A-W Visual Aids

The adequate wiring bureau has cut loose with a set of demonstration material, incorporating large house-plan charts and colored thumb tacks, which makes easy the explanation and teaching of wiring to home-service and other customer-contact employees as well as small consumer groups, etc. Members of the class or audience participate by building up the wiring on their own ¼-in. scale house plans, which are duplicates of those used by the instructor. Prices are very low. For instance: script, stage directions, chart, thumbtacks and 10 practice plans cost $3.50 (order as Catalog No. ET-1). Additional practice plans are 50c per 100 sets. Either Catalog e/2, which gives full details, or the material itself may be obtained from the bureau, 155 E. 44th St., N.Y. 17.

DRUG STORE. Reliable Drug Co., Commercial Drive Store, Vancouver, B. C. Fixtures supplied and installation made by Neon Products of Western Canada, Ltd., with advisory service by B. C. Electric Railway Co., Ltd.

Problem

To relight a selling area of 33x34 ft., having a 10-ft. 9-in. ceiling.

Solution

Cold cathode and incandescent combination. Each of the eight fluorescent fixtures contains 60 ft. of 15-mm., 60-ma. white tubing, shielded by Skytex glass baffles, consumes 360 watts. Rows are 7 ft. 6 in. apart. Incandescents are 300-watt Holophane Correctalites, also in 7-ft. 6-in. rows, with 5-ft. spacing in center and 10 ft. 10 in. on the sides.

Results

Color balance plus sparkle for effective merchandise display in an installation delivering 60 ft.-candles.

Combinations for Commercial Lighting

SHOE STORE. Ingledew's Store, Granville St., Vancouver, B. C. Installation by Jarvis Electric Co., utilizing fixtures supplied by Brettel Electric Ltd., with design assistance from B. C. Electric Railway Co., Ltd.

Conditions

To relight a selling area of 16x60 ft., with a ceiling height of 11 ft.

Solution

An installation of combination fluorescent and incandescent lighting. For the former, 4-lamp Gill luminaires are employed in continuous row, while for the latter Holophane Correctalites are installed on 8x9-ft. centers. The fluorescent lamps are 40-watt, 3,500° white, and the incandescents are 300-watt clear.

Results

A sleek installation delivering an aver-average intensity of 65 ft.-candles in service.

May's—An Idea Mine

Los Angeles department store's swank new appliance shop on Wilshire is worth a visit by any dealer

Separated from the main store, all its window exposure on three sides of the block can be used to display appliances. Opening, without backgrounds, into the main store, the entire store becomes a display visible from the street. The center picture shows a section of the small appliance department at one corner of the store. Massive displays, like the "dream" one pictured here, are well lighted, and catch the eye of the thousands of passing motorists on parade

MAY CO. will do all right with its new Wilshire Blvd., Los Angeles, appliance store. Adjectives wasted extolling its superiorities have little meaning to other dealers. What are of vital interest in this much talked-about, full block-square, 26,000-sq. ft., super appliance display are selling ideas any dealer can well employ. It is well worth any dealer's time when in Los Angeles or vicinity to make a special visit to this spectacular store and take in these details.

Never mind the 44 refrigerators, 17 electric ranges, 12 complete electric kitchens, 33 washing machines, 22 vacuum cleaners and 6 ironers on display—what is significant about them is this:

1. Everything works. Every appliance is connected and customers can push buttons, turn knobs, try out the wringers, etc.

2. Customers can compare. Competitive products of the various lines carried are all in one group and the prospect can try them all and decide which he wants.

3. Kitchens can be bought completely installed. Any of the 12 complete kitchens shown there or any combination can be bought as a unit with appliances, cabinets, electricians, plumbers, carpenters, painters, tilesetters, etc., included on the department store's single time payment plan.

4. Because this is the day of the automobile, parking is provided. There is a 600-car parking lot, complete with white-garbed attendants, at the rear of the store.

The significant thing about the latter is that at least 80% of the store's business is expected to come from floor sales rather than field selling. This means that provision is made so that traffic can flow easily to the store.

These characteristics, plus a number of excellent details, make the May Co. store something to be visited by dealers as well as by customers.

Among these details is the number of small, comfortable "closing booths," a little like breakfast nooks, in which the salesman can sit down with the prospect and sign up the order.

Another interesting feature is the 104-seat auditorium and stage equipped with a complete electric kitchen in which a constant program of lectures and demonstrations by the store's own and visiting home economists will be conducted as a means of bringing traffic to the store.

Other Los Angeles dealers wondered where all the merchandise came from. They have been begging for it themselves for so long that to see this tremendous array aroused a suspicion of favoritism. However, at the present time the display is only one-deep. The

May Co. carries a large number of national franchises and each one of these supplied one each of its several models. Placards indicated that these were samples only and not for sale.

The store was opened with characteristic Hollywood fanfare. Mayor Fletcher Bowron presided at the May 24 opening. Some 10,000 people crowded through during the first day and continued swarms of people passed through it during its entire first two months. It is located on Wilshire Blvd.'s famous "Miracle Mile" near Fairfax Ave., adjacent to the company's big Wilshire store. It was put in a separate building of its own because the space formerly occupied by appliances has been filled with other merchandise, according to Tom May, vice-president of May Co. stores. J. B. Macauley is the store manager. The building is completely air-conditioned and lighted with fluorescent flush-ceiling fixtures. Additional spot floodlights are mounted to highlight groups of appliances.

B. C. Hot Water Book

A remarkably adept handling of both electric and gas automatic storage water heaters in one combined sales manual has just been done by British Columbia Electric Railway Co. Ltd., Vancouver, B. C. John H. Taylor, director of dealer development, after considerable study, prepared the unique booklet of 16 pages for distribution by his department to all members of the industry who sell and install this type of equipment.

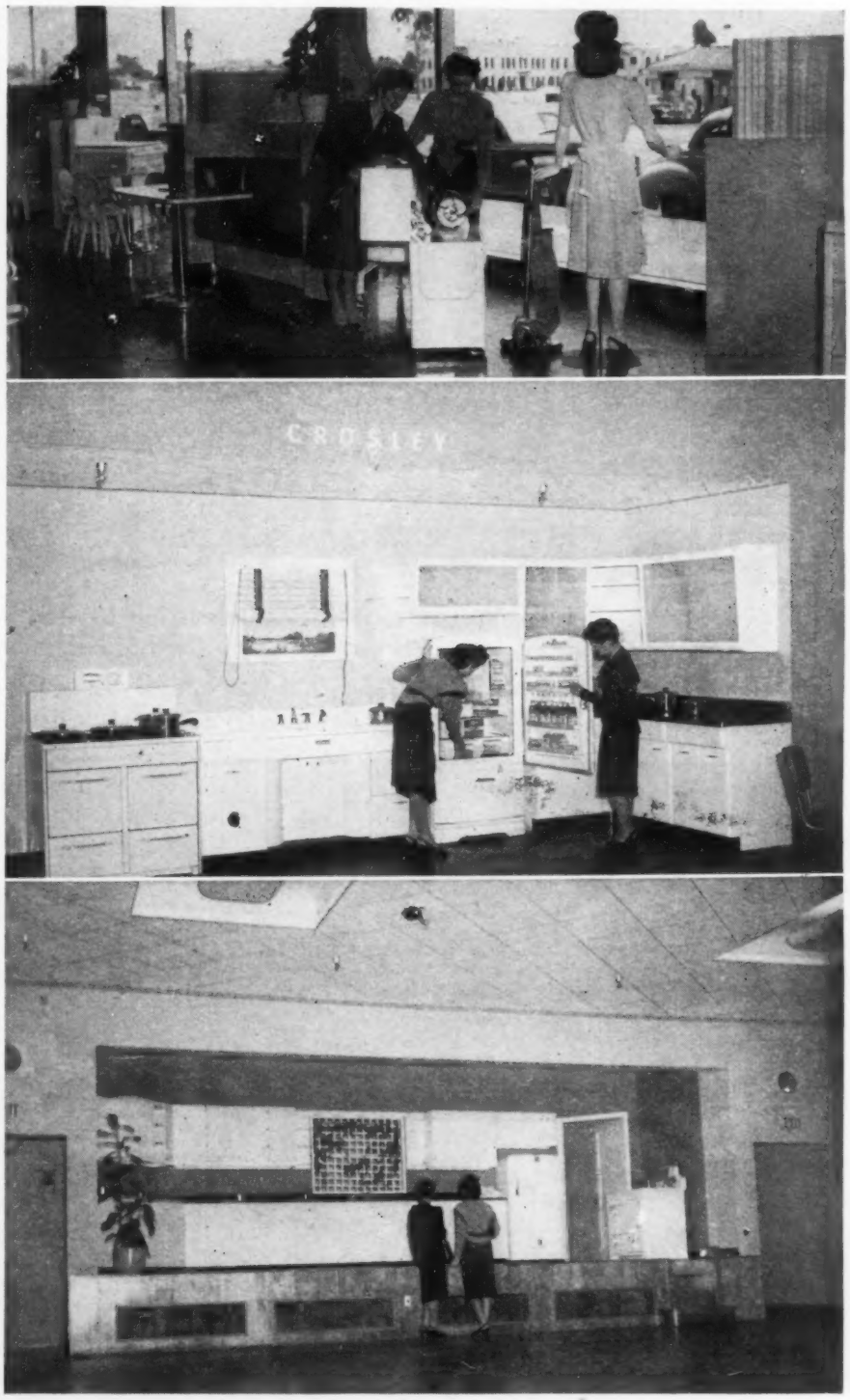
The contents include first, a discussion of the need for water heating, and particularly automatic storage water heating of the kind that comes in "hotel service". Then taking the EEI basic sales training course outline of product analyses, it breaks down the sales presentation into a list of advantages and how they are accomplished, disadvantages and counterbalancing benefits of the new methods, the organization of selling facts, the solution of the need, assurance and value. This portion takes half of the book.

The remainder of the book points out that there is no such thing as free hot water from furnace coils or kitchen stove, or "monkey stove", when fuel really must be paid for. It deals with the cost of operation and in particular the residential rates of this company.

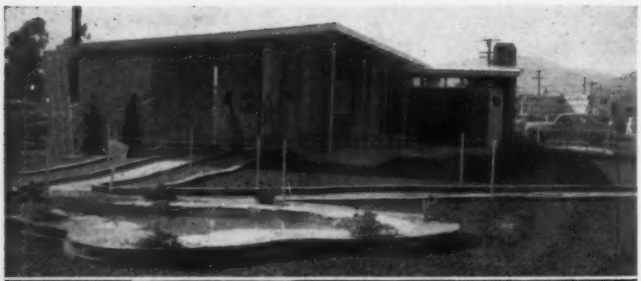
A very sensible analysis has been made of which type of water heater to install. It tells which type of customer should use the electric and which the gas. The distinction is made that if the customer is using gas for central heating purposes, or in particular cases where electric wiring installation is exceptionally high, gas water heating is recommended. The electric is recommended wherever the customer uses electric range or where there is no convenient flue or means of venting the gas, or where suitable locations for the gas water heater mean a long run of hot water line.

The types of water heaters and the arrangement of elements is next discussed, the size of water heater to install, and general information on installation, followed by diagrams of wiring and plumbing.

Attractively printed in blue and orange, it is a handy and compact sales manual.



More of May Co. ideas are in these pictures: At top, window displays are open and become accessible as floor displays which customers can walk into. Note the "breakfast nook" niche, where the salesman closes the order with the customer. Center, one of twelve complete and operating kitchens along the rear of the store. Below, the stage of the auditorium in which daily cooking and home-making demonstrations will be made to crowds that visit the store



APPLIANCES practically dominated the scene at the Construction Industries Exposition and Home Show of Southern California, held at Pan-Pacific Auditorium, Los Angeles, July 12-21. Although sponsored by construction industry groups, there was comparatively little new in construction materials but everything new and up to the moment in appliances was on display, either by distributors, dealers, or manufacturers.

While the first day's crowds were small, possibly due to some lack of the customary Hollywood ballyhoo, by the end of the showing, when a complete two-bedroom house was given away to a war veteran, attendance increased to show-size proportions.

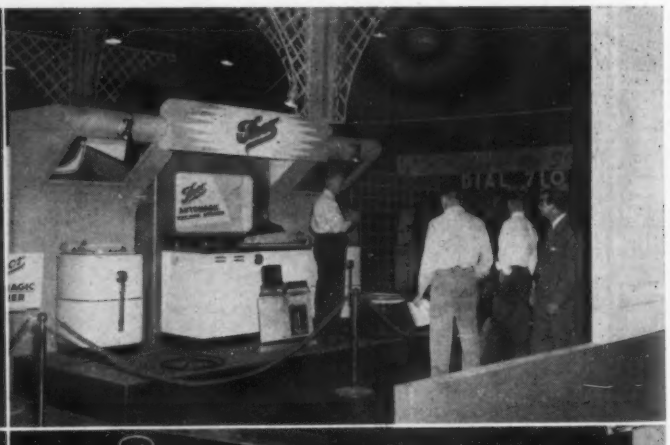
Since admission was charged to the show, exhibitors felt that those who attended were prime prospects and not mere sightseers. It was with this idea that the construction industries group, sponsors of the show, operated. Among these, representing electrical industry organizations, were the National Electrical Contractors Assn., Los Angeles Chapter, and the Southern California Radio & Electrical Appliance Assn.

Of the 140 or so exhibitors, 40 showed electrical or appliance equipment. The Department of Water & Power, Los Angeles city utility, faced its rival gas company model kitchen near the entrance with an exhibit illustrating both model kitchen equipment, electrical, and the

Appliances Steal the L. A. Home Show

Home hungry crowds pay admission to view appliance and wiring exhibits which occupy a third of huge Pan-Pacific show

Four out of forty or more brilliant displays that dealers, distributors and manufacturers exhibited, July 12-21, 1946



wiring that is essential for electrical living. A skeleton framework of a house showed where the wiring should be placed. Oddly enough, this was one of the few genuine construction exhibits in the entire fair. It is pictured on p. 80, below the model home.

Largest distributors among the electrical group were Westinghouse, Leo J. Meyberg Co., Thor-Pacific Co., Thermador, Herbert H. Horn Co., showing Admiral appliances, Sherman-Swenson & Assoc., Gough Industries, and Nelson R. Thomas, showing Universal electrical appliances.

Other electrical exhibitors included: C. G. Hokanson, showing General Electric equipment, L. K. Ward, a dealer; U. S. Grant Supply Co.; Given Machinery Co., showing hobby tools; Johnson & Ellison, neon lighting; Utility Appliance Corp.; Rex-Air vacuum cleaners; Harry F. Haldeman, air conditioning; Southern California Telephone Co.; Drayer-Hanson, showing a new Airtopia reverse-cycle heating and air conditioning unit; Commercial Refrigeration Co.; D. E. Sanford Co., distributor of home appliances; Roach-Driver Co., electrical appliances, Majestic; Ray Thomas, Launderall washing machines; Weber Showcase Co., freezer cabinets; Given Machinery Co., a garbage disposal grinder; Universal Refrigeration Co.; Interstate Engineering Co., a new vacuum cleaner and a water softener; Hoffman Radio; Taylor Appliances, showing the Kirby vacuum cleaner; Appliance Delivery & Service Co.; Pryne Fan Co.; Trade-Wind Inc., motor fans; Jones-Gowing Co., Modern Maid washing machine and appliances; Electra-City, appliance dealer of Hollywood; Penn-Owsley Music Co., radios and music equipment; Wilford Bros., Monitor electrical appliances; James W. Mellen Organization, freezer cabinets; Radio Products Sales Co., appliances; Rex-Air, air conditioning equipment, Pacific Coast Wholesale, Brunswick radios; Polar Bear Air Conditioning Co.

The elaborate Westinghouse display was in charge of T. B. Kalbfus, district sales promotion manager for the Westinghouse Electric Supply Co., Los Angeles. It brought to public view for the first time several new display features and made use of some of the special equipment built for a recent electrical exposition at Dallas, Texas. The miniature model kitchen and the wiring display board containing miniatures of electrical appliances in the four different price ranges of homes were seen for the first time in southern California. A full-size model kitchen and laundry was also on display, as well as other electrical equipment for the home.

The two dealers having large-scale exhibits at the show were Electra-City, managed by C. A. Stuewe, on Hollywood Blvd. near the famous Grauman's Chinese Theater, and Leonard K. Ward, with stores in many southern California communities and offices at 2141 Colorado Blvd., Los Angeles. Both claim modestly to be America's largest electrical retail store, a claim also made by the recently opened May Co. on Wilshire Blvd.

There was one demonstration of television equipment. Sherman-Swenson & Assoc., distributors for Farnsworth, had a table model television receiver upon which each evening local telecasting was picked up and shown to the visiting crowds.

Herbert H. Horn Inc. made the first public showing of the new Admiral line, particularly its electric range and refrigerator.

Among new products developed in southern California, three or four were given special prominence. Drayer-Hanson Co. showed a first model of a new compact reverse-cycle heating and air conditioning unit for homes which it called "Airtopia." The unit is equipped to heat, cool, humidify or dehumidify and filter the air.

Given Mfg. Co. showed a new design of garbage disposal unit called the "Waste King." Interstate Engineering Corp., former maker of aviation equipment at El Segundo, showed a "Compact" bagless type vacuum cleaner and also a water softener and a water cooler. Hoffman Radio Co. showed beautiful cabinet designs in modern blond wood.

Illustrating again that the gas industry is reaching always to try to provide the automatic features of electric equipment, O'Keefe & Merritt Co., now a division of the Utility Appliance Co., had on display a new gas range whose oven and burners were turned on by a remote electrical control, mounted separately on a display stand.

● When her husband died, Mrs. Viola C. Wiesmann and his two partners, Glen Evans and Clyde Martin, carried on the business of Orange County Wholesale Electric Co., Santa Ana, Calif., started in 1940, and now expanding into a new building on Main St. with much larger space. Operating only in Orange County and with a policy of strict teamwork with electrical contractors, dealing only in electrical supplies, the trio have built up a business which has the backing of the entire trade in the area.

● A Two-day Meeting of RCA-Victor distributors was held at the new RCA headquarters for the West Coast at Los Angeles last month, at which two factory officials, Herb Allen, field sales manager for Victor records, and Jack Williams, advertising manager, covered the commercial plans and potentials for the record industry. Distributors from Billings, Salt Lake City, Seattle, Portland, San Francisco and Los Angeles were in attendance. Promotion plans include holding a special week such as for "Spike" Jones, featuring his records with special albums, etc. There are also plans for a big anniversary feature record, after making up the one-billionth record, and tie-ins with movie features, such as the one on the life of Cole Porter called *Night and Day*.

Include Appliances

It will be good news to electrical dealers that the national housing agency for the Federal Housing Administration is ready to guarantee to lending agencies such as banks, etc., financing for a number of items, including appliances, in the mortgage for a new home, under certain conditions. In Bulletin No. 16 issued by the FHA in Los Angeles, it includes among electrical items: automatic controls for garage doors; dishwashers for sequence operation; an electric generating system, for a farm home, for instance; ventilating fans other than built-in for attic or kitchen; garbage disposal units; laundry equipment for sequence operation; sump and sewage pump; electric range, free standing with a rigid connection or permanently built in; refrigerators, mechanical, free standing with plug-in connection or permanently built in; individual room coolers; space heaters; valance boxes (which could include fluorescent lighting); water supply equipment, including pump and storage tank and pressure systems or water treatment apparatus, including chlorinators, filters or softeners. Any of such equipment must be permanently installed.

The bulletin states that upon request of the mortgagee, such easily removable real estate items will be considered in estimating replacement cost of real property when completely specified and clearly indicated in drawings accompanying the application. The title will be vested solely in the mortgagor prior to submitting it to the administrator for endorsement.

What this means is that an electric kitchen and appliance equipment such as that listed may be installed in the home when it is built in and included in the price of the mortgage. It therefore provides a sales opportunity for dealers to sell complete electrical equipment for such homes as are being built at the present time. The purchaser will not be requested to furnish extra down payments and installments which might inhibit ability to buy.

Appliance Association Reviews Progress

Five hundred dealers crowd Los Angeles Ambassador to hear advice and viewpoints from the experts

REDUCE selling costs but not selling effort, was the advice given to 550 appliance dealers and distributors at the first annual spring sales conference of Southern California Radio and Electrical Appliance Assn. at Los Angeles, Hotel Ambassador, June 20, by Kenneth L. Hampton, manager of the Valley Electrical Supply Co., Fresno. Hampton, speaking on the subject, *Operating an Appliance and Radio Business to Make a Profit,* is well known to readers of ELECTRICAL WEST SALES GUIDE for his precise and sound merchandising sense.

"The OPA shortened margins on household appliances on the premise that the demand for these products would be so great you wouldn't need to sell them. You were not supposed to be having selling expense," said Hampton. "Yet, already in many parts of the country, new appliances are moving slowly.

"It is a merchandising law that it is fallacious, even financially suicidal, for a merchant to assume that the public will come in and take the merchandise away from him. It never has been true and never will be."

Two methods were suggested by Hampton to reduce selling costs and yet maintain selling effort.

"There are two great groups of capital invested in the appliance industry which want to see you dealers succeed. Both of them need appliances sold in increasing numbers if they are to prosper.

"One group of capital is that of the manufacturers of the appliances. The second great group of capital which wants you to succeed is in the electrical utilities.

"You can lean on the manufacturers and the utilities to help you sell appliances without raising your selling costs. With the help of the manufacturer and the utility, operating through an organization such as this association, any retailer can gain considerable sales promotion help at very low cost to himself. Through cooperation of this kind, all can work out promotional activities, campaigns, put on expositions and other events, and share the expense so that sales costs actually will be lower."

Hampton also suggested that with shorter margins, that cut deeply into profits, many of the extra services formerly given away free to the customer should properly carry a charge. This means such items as delivery and servicing, where not covered in the purchase price or guarantee.

This was the first sales conference under the direction of William J. Quinn, recently appointed managing director of the association. Quinn outlined briefly the activities undertaken by the association, including its sales training program, participation in the home show, its dealer newspaper, and many other personal services to the individual members. Robert H. Cockfield, Los Angeles Department of Water & Power, president of the association, welcomed the industry and introduced its officers, directors and committee chairmen. Jack Hargrove, vice-president, Kinney Bros., and chairman of the sales conference committee, acted as master of ceremonies for the evening.

Earl W. Beebe, in charge of marketing for Drayer-Hanson Co., Los Angeles, presented an exceptionally timely message in regard to sales training. Warning of a competitive era of selling soon to come, he urged dealers to meet the situation with well organized and well prepared sales forces, properly trained. Sales meetings, held frequently, were recommended as a beneficial means of keeping inspiration alive. However, such meetings, he said, should be carefully planned so that the salesmen receive worthwhile and usable ideas and do not waste their time or become weary of repetition.

To salesmen, his advice was not to make mere good-will calls, but always to have an idea, a service or a product to present. The qualities of a good salesman, he said, are (1) knowing what you are talking about; (2) believing in it with all your heart, and (3) telling people about it in simple words.

Of particular interest only in the Los Angeles trading area was the market research and forecast of business volume for the area presented by William Dover, director of market research, Los Angeles *Examiner.* With slide illustrations, Dover showed the increases in population during the past five years and that expected during the next five and projected what this would mean in dollar sales of durable goods.

Jack Hargrove closed the meeting by calling for brief comments from several distributors and manufacturers as to the outlook for merchandise.

● A SPECIAL SESSION of the Home Planners Institute was carried on for a summer session in San Diego under an intensified schedule. Instead of a once-a-week meeting, there were three meetings a week, and it was designed especially to interest the G.I.s who are planning to build homes under the housing regulations. It was held in cooperation with the Veterans' Administration and the Home Planners Institute of San Diego. There were 59 in attendance and it started June 17.

● SEARS ROEBUCK CO.'s San Diego store has completely remodeled its appliance department, according to manager Hill.

Beebe Hampton Dover

Hargrove Quinn Cockfield Langlands

ELECTRICAL WEST Sales Guide

FOR THE ELECTRICAL MERCHANT OF THE WEST © AUGUST 1946

Good Policy is Good Business

BESIDES being the **right** thing to do, the good trade practice is usually **good business.** This is not a moral lecture but a discussion of methods and ideas in the appliance business that are profitable and successful. Good or decent trade practices contribute to profit and success. Experience proves it.

After all business is no dreamed up theory. It evolved. It grew out of mankind's need to exchange work for the products of other men's work, products needed and not conveniently made or produced by one's self alone. Through centuries of experience in trade, about everything has been tried—good, bad, slick, sharp, crooked, shady, greedy or dumb.

Out of it all certain practices have been found to work and to make for success over the long pull. Others have been found to bring the illusion of quick success but a hangover of disgrace or failure. Whatever the spiritual or moral aspects, and there are many, of course, just the good business ones should cause any sensible person to try to follow the paths that experience teaches are the right ones.

Often, looking at the other fellow's sensational ads and offers of deals, a dealer is tempted to follow suit. Perhaps he hasn't the time or the facilities to look into it and measure up its soundness.

Knowing this from their own past and sometimes painful experience and anticipating this temptation, some groups of dealers have jotted down their ideas and exchanged them. In such committee work the practices which are good for a dealer or his industry have been written into suggested policies everyone should accept.

Two organizations at the opposite ends of the West have done this. They are the Bureau of Radio & Electrical Appliances of San Diego County, in California, and the Canadian Association of Radio & Appliance Dealers, in British Columbia.

The San Diego Bureau's planning committee, after study and debate, brought out a report of such suggestions to the trade. This committee was then headed by the now president of the organization, Frank Guasti. Excerpts from that report, as it applies to the dealer, will be reviewed here.

In a talk before the Northwest Electric Light & Power Assn. Business Development Section meeting in Portland recently, G. Langtry Bell, a Vancouver, B.C., dealer, who is a director for British Columbia in the executive of the Canadian Assn. of Radio & Appliance Dealers enunciated some of the very same ideas and ideals. No better proof could be found that the policies they both advocate are basic to good business than this. Dealers in widely separated regions, even in different nations, with completely different environments and kinds of business establishment, found that the same rules of decent practice were necessary for financially sound and healthy business.

In the planning committee report from San Diego there are listed on the next page the following "former dealer practices that need correction":

Better that you cooperate with the Better Business Bureau than that your customer take you there

(a) **The following discount policies** are recommended:

1. No cash discount should be allowed.

2. No premiums of any type, including trading stamps, which are a form of discount, should be given.

3. No discount should be given to any person for any reason, except purchasers of multiple units. The latter should be allowed a discount for the reason that ordinarily the expenses connected with such a transaction are less than the proportionate expense on sales of single units.

(b) In recognition of the practice of some firms to consider a **90-day account** as a "cash sale" while others have charged interest on such transactions, it is recommended that all dealers unite on some uniform policy in connection with such accounts.

(c) **Trade-in allowances,** if inflated, amount to giving a discount. Therefore, the following procedure is recommended as a uniform policy:

1. All trade-in allowances should be based on the market resale value of the appliance in question, less cost of reconditioning, if any, total overhead connected with the sale and a fair net profit to the dealer.

2. While it is recommended that no trade-in allowance be made on merchandise other than the type being sold, it is recognized that this policy cannot be made uniform; therefore, if such transactions are made, it is recommended that the same formula for allowances as are set forth in the preceding point be used.

3. Recognizing that a practice of guaranteeing a definite trade-in amount on the purchase of an electric refrigerator has developed in the present sale of ice boxes, it is strongly recommended that this practice be discontinued as not being in the interest of sound business operations.

(d) While term selling is controlled by government regulations, it appears somewhat futile to establish term selling recommendations. But it is strongly urged that when and if such regulation is revoked reasonable uniform policies in keeping with the over-all economic situation at the time be uniformly adopted.

(e) **Advertising of appliances** should be consistent with merchandising policies. Therefore the following recommendations are urged as uniform procedure:

1. No misleading statements should be included in connection with any appliance advertising copy; if such instances occur, efforts should be directed to the closest cooperation with the Better Business Bureau in its efforts to eliminate unethical and misleading advertising.

2. Advertising of trade-in allowances should be general in wording and never specific in amount, nor should a trade-in allowance be included in the net sale price of the advertised merchandise.

Examples of approved statements would be: "Liberal trade-in allow-

ance" examples of unapproved statements: $5 for your old....," "Sale price $...., and your old....."

(f) **Competition between stores** of the same class as to percentage or amount of compensation for appliance salesmen is recognized as a practice which could lead to labor pirating and to unwarranted selling expense. It is therefore urged that study be given to the problem with a view to working out recommended compensation programs that might be reasonably uniform for dealers of similar classifications.

In listing suggested **service policies,** (too long to be detailed here) the San Diego group urged policies that would make appliance service pay its own way. To this end it recommended: (1) efficient technical men, (2) listed charges with regular profit on parts, (3) charges for outside calls to include time away from the shop and car or travel allowance, (4) a charge for estimates made, the amount to be credited if the work is awarded, and (5) that the service department be credited at 10% above cost for all maintenance work, other than retail service.

One of the chief losses from service is the giving of free service beyond guaranty commitments. It recommended uniform policy in this respect. Likewise uniform wage scales for service personnel was recommended, as well as schedules of car allowances.

To protect the public and the industry from improperly qualified and unskilled men, it is recommended that some sort of control be established through examinations, certification or similar processing.

Other recommendations made by these organizations deal with distribution policies by manufacturers and distributors. Those just recited here, however, are within the dealer's own sphere of influence. They are in the class of "putting one's own house in order." Decent policy on the part of the distributor and manufacturer is just as important, just as sound, just as good business for him and his dealers. The slick or tricky or short-sighted selfish evasion of good trade practice by the latter will lose him the support of sound dealers, without which he cannot hope to stay long in business, big or small.

If the word "ethics" sounds sanctimonious then let the word "good sense" be used instead. For ethics are good sense. They are the standards that men in business over the long haul have found to be good for the business because it is good for the customer too.

Your Advertising Should Please

Eighth of a series of good sense articles on business management

By Ken Hampton

ADVERTISING is telling the world who you are, where you are and what you are there for.

Advertising is the retailer's invitation to the public to get acquainted. Just as in life, if the getting acquainted pleases, friendship follows, and with it trade.

Your advertisement should be a personal message to each of your customers. As such it should be newsy, factual and sincere. It should not only be about something definite but it should tell simply and completely all the customer wants to know about the article advertised. If complete information cannot be given, then give as much as possible and tell how the rest of

the detailed facts may be easily obtained.

Retail advertising fulfills its function best when it acts as a daily market report on the needs of the moment.

It should be directed to the store's customers through mediums they are used to. It should tell a straightforward story of the current parade of articles you have available for your customers.

A store's advertising program should be planned. First a budgeted amount to be spent for advertising should be arrived at. As a general rule 2% of gross sales is recommended for this amount. Then the advertising should be planned to show the store and its organization to the public in the way the owner wants it shown.

If the store's policies are conservative all the advertising should reflect this—if it is planned to create a flamboyant atmosphere then all display and advertising should work toward that end.

When this policy has been hit upon then all means of identification should be used to conform to the impression that is to be created. The store name signs, the business cards of salesmen and members of the firm, truck signs, letterheads, invoices and all firm name signatures to be used on advertisements should be as uniform as possible.

When writing your advertising message write it from the customer's point of view. The customer is the one to be told about your merchandise. Tell him clearly, simply and well what you have for him that you have to sell.

Then check your advertisement to see if it is timely, and honestly and clearly states your offer. For example, does it tell—

(a) What you offer in the way of benefit or service.
(b) Why it will render such benefit.
(c) Where you are located.
(d) When the goods are offered for sale.
(e) How the goods can be obtained and paid for.
(f) Who made it and who you are.

Then check your advertising if possible with your service men and salesmen. Let them read it and work in their ideas of what the customer wants to know. Let them know what you advertise and offer so that they may back you up on it.

Take time and have a regular time to prepare your advertisements. A salesman can correct an error in speech made to a customer, but once published your advertisement stands out coldly to help or hurt you with your friends, the customers.

As a retailer, all of your advertising should be directed to the restricted area in which your customers reside or work. You want to reach these customers with repeated invitations to patronize your store. To do this, identify your store with adequate signs. Use good display in your windows. Above all, use proved advertising media such as newspapers, radio stations, steadily and regularly. Use direct mail, billboards and other special media sparingly and then only on expert advice.

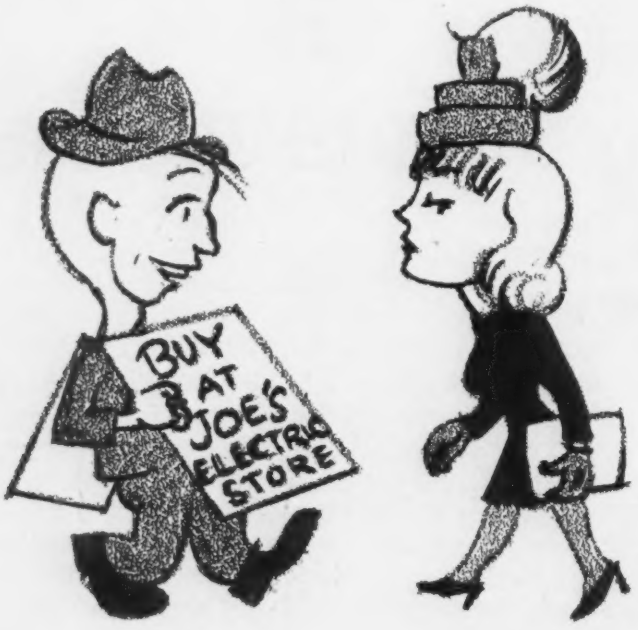
As for congratulatory messages and local school papers, event programs, etc., consider any expenditure as a **donation,** not advertising, and you won't be disappointed in results.

There is no question any more as to the value of advertising to a retailer, for time has repeatedly proved the truth of the old saying "Either a merchant advertises or the sheriff does" and no one likes to read the sheriff's sales copy on his own business.

It is not the function here to make suggestions on copy or layout for advertisements but every merchant should have as part of his trade tools a text on advertising fundamentals and read it at least once and leaf through it occasionally.

These two suggestions are pertinent: (1) Everyone likes to look at pictures, so use illustrations lavishly. (2) Everyone likes to read personal letters, so use testimonial copy when it is possible to do so sincerely.

Above all, tell a complete story: from size to price about the article you advertise—from who you are to why you are there, about your store; and tell it consistently and often.



Boise Dealers Grow

Always active merchandisers, they only await appliances to make trade hum

ELECTRICALLY minded Boise is all set for plenty of action as fast as appliances can be rolled to them to sell. In fact, a visit to them earlier this year found them doing very well even with what they could get their hands on. The importance of Boise as a trade center, electrically, was further emphasized by Salt Lake Hardware Co., General Electric Supply Co. and Westinghouse Electric Supply Co., each expanding wholesale facilities to serve the area. Each was doing a truly modern job electrically too.

Salt Lake Hardware, for instance, was putting in a troffer lighting system, underfloor duct, night lighting and a watchman system and adequate lighting control. Westinghouse Supply was opening a new branch there.

Dealers too were all ahead of the parade with their remodeling and expanding. The C. C. Anderson Co., department store, had moved its appliance and plumbing department into a separate store on Bannock between Ninth and Tenth. The Appliance & Record Shop, owned by R. A. Fifer's furniture and appliance store, had moved its appliance business into the store formerly occupied by Gem State Electric Co. at 213 N. 10th St., with R. H. Witter as store manager. An attractive record and radio department was built in the rear of the store where it is intended to handle 14 makes of records.

As a Norge dealer, a St. Charles kitchen, Norge equipped, was planned for the store near the back, with the traffic appliances up front and a future housewares basement contemplated.

Terry's, the General Electric dealer, was drawing business into a new shopping district it was creating. Ample parking space, a wide expanse of windows on two sides, making the interior a show window itself, introduced some new display ideas. The circular lamp and service counter at the rear was attractive, and a compact display of residential lighting fixtures built trade before the appliances rolled in. One window was placarded, "Appliances in this window are for sale" to indicate that it wasn't all dummy display.

Oakley's (center) is more than an appliance store, it is a veritable shopping center where the various enterprises of Arland Oakley and his partners have grown since he and his brother, Sterling A. Oakley, (now an executive and engineer for Hotpoint) started in 1914. It now includes Oakley Automotive, a wholesale auto supply company; Oakley-Moody Service, an auto radio repair and testing company; Oakley Electric, the electric retail appliance business; and Starkey Electric Service, the appliance service organization. Now owning the 100 x 122 ft.-building, Oakley was modernizing it, installing cold cathode lighting, electric kitchens and laundry and a record department. In the electric businesses, his partners are Allen Shaver, Con Shane and Myron Dorsey; in the service company, B. O. Starkey, P. E. Kerwin.

Joe J. Hon, formerly in partnership with Otis Hon, who now specializes in music, radio and pianos, as Boise Music & Appliance Co., has opened a modern designed new store, called Century Electric Co., at 211 N. 8th. Fluorescent lighted, with high and wide expanse of glass, well spotlighted, the store also has a line of sporting goods and boats. Hon has the Westinghouse and Philco franchises. Former Idaho Power Co. display manager Newport is associated with him.

ELECTRICAL WEST

McGRAW-HILL COMPANY OF CALIFORNIA
68 POST ST. SAN FRANCISCO . 4

The all-industry magazine of progress, established 1887 and incorporating the "Electrical Journal," "Journal of Electricity, Power & Gas" and "Journal of Electricity." Contents Copyrighted.

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How to Make the Public Mad

SO far as we have been able to determine, no major American community ever suffered the creeping paralysis of a complete utility strike. Electric service has stopped; transit lines have been idle; gas has been shut off and telephones have been silent in separate instances because of labor disputes. However, never have all utility services been denied to the public simultaneously. The consequences of such a disasater from the standpoint of public health, convenience and safety have been too awful to even consider such a possibility.

Yet the threat of such a complete community breakdown was made just recently against the people of Honolulu by union leaders. The issues are unimportant and immaterial. The significant thing is that such a course of action could be justified as a means of seeking relief in a dispute between labor and management. To a close student of public opinion, it would appear as though the union leadership reckoned without thought of how the public might react. It is our belief that the public will never stand for a deliberate closing down of all utility services.

Electric, gas, telephone and transit service individually and collectively are the very vital elements in modern living. Stop them and people can no longer work; health and safety are endangered; amusement and recreation are stopped—all of the highly mechanized machine of modern civilization comes to a complete standstill. To us it would seem that public reaction in such a calamity would be immediate and resentful. No group of individuals is strong enough to withstand the public wrath and desire for vengeance that would develop as a consequence of such a catastrophe.

These observations are set forth without bias or partiality. They apply to labor or management—if either feels equal to assuming the responsibility of defying the public.

Room to Grow

CLASSIFICATION of jobs is nice theory and no doubt it gives unions a feeling of doing something constructive for their members, but is it always fair? In theory the worker properly classified gets his fair wage and is not imposed upon by his superiors to do extras out of his classification at no extra pay. But how else does a man learn something of the job above him so that, if opportunity presents, he may step up into it?

This was talked of in one of the PCEA meetings among men responsible for large operations. They were wondering where they would get supervisory personnel in the future, if they were held strictly to keeping all their men within the confines of their job classifications. One expressed his disgust in these words.

"Why, all of *us* are working out of our classifications."

"We are if we are *working*," said another.

Unions should recognize the inate yearning of all men to rise in life and make provisions in their contracts to give the ambitious a chance to grow. To hold all men down to a level of mediocrity is to defy, at some risk, a deep human driving force that is strong in some men and will make them want to burst the unions if they cannot break this bondage.

Back of the Machine

WRITES the Army, publicizing, for some mysterious reason, its antiaircraft radar SCR 584: " Soon after it was placed in action the beaches (of Anzio) were strewn with the wreckage of German aircraft."

Now we saw the beaches of Anzio from D-day on and can report with authority that at no time were they "strewn with wreckage of German aircraft." Even granting that the expression was coined by an enthusiast, we are still left with a false over-all impression.

The Army would have us imagine a pip on the radar scope, the flash of a synchronized AA gun, and the plunge of a Messerschmitt, like a clay platter at a trap shoot. Actually it goes more like this.

We're in our dugout and Sgt. Awen looks at his watch and says "they're late tonight." Then we hear one of our guards yell, "Put out that God-damned light," and Sgt. Awen adds, "Well, not very late." About the time he says that, a battalion of ninety millimeters opens up. Sixteen men slowly beating sixteen big, taut bass drums at random would sound about the same. We grab our helmets and go out for a look.

Way up among the stars in the northern sky, maybe 10,000 feet up, we see tiny pink flickers of light, and some seconds later we hear something like the sudden ripping of gigantic canvas. But low down, almost overhead, a little to the south perhaps, we can hear the funny put-put of a kraut plane.

By now the resonant "punk" of long-barreled AA guns is frantic, more battalions of nineties have joined in, and there's flickering and crunching in almost every part of the sky. There's more buzzing and put-putting overhead, too. Flares blossom like amber planets and the terrain glows forth among shadows more revealing than daylight. Then the bombs start whistling down; the earth shakes and there's great roaring and whining in the air.

This regular evening performance might last for ten minutes or forty-five. Next day's report might credit the AAA with 2, 3 or 4 planes. But only once in a month or so would you otherwise know that any had come down. What you'd know had come down was a hell of a lot of bombs, flak, and our own heavy stuff that hadn't gone off up there where it should.

Now we happen to be well informed on the capabilities of the SCR 584, and we're not trying to run it down. We are trying to make clear that, like other fine electrical equipment, it is one small part of the means to a remote goal. It is as good as the men who run it. It is men who may achieve the far away goal—be it the destruction of the Luftwaffe, a satisfied citizen or a peaceful world.

What's Good About It?

EVERY editorial should not be a gripe, one of the readers reminded us. So this will be the Pollyanna corner, even if it kills us—or the reader. Hold on to your hats!

What's good about this old battled-scarred industry these fine sunny summer days? Plenty!

Even after taking all the kicking around it has it is *still* a good business to be in and *work* at. It is still growing tremendously, so that makes for plenty of opportunity for individual growth with it. It still brings forth new devices, new methods, new techniques, new ideas. These will keep any man's interest alive if he has any eagerness in him. It still has youth.

Never in its history have electrical products and processes had such acceptance and demand, but even so there is still room to convince still more people. That means opportunity too. Yet none of the products or processes are perfect as yet. There is still room for refinement and improvement. There's still a chance for the inventor and the creative designer.

Recognition of the individual is making more progress in the electrical business than in most any industry. Its unions are better than average in understanding. Its workers are better than average in intelligence and in loyalty. Its executives are better than average in tolerance, progressiveness and appreciation of the views and needs of the people working with them and for them.

OVER-EMPHASIS on the need for security is dangerous, since there is no such thing as complete security in the world. Although in the early developmental years it is important to give a feeling of security to the child, from then on he must be taught not the mistaken notion that he is secure, but how to live in an insecure world.

We should aim to develop personalities capable of dealing with all situations and able to bear stress and strain, rather than to create a social organization which relieves individuals of all necessity for strength of character and feeling of responsibility.

Unfortunately at the present time the idea is growing that the government is responsible for everything, and that we have no responsibility either for our own condition or for that of our fellow man. Such a philosophy will inevitably lead to a type of collectivism in which a limited few will dominate the behavior and thinking of the many. This trend is neither new nor progressive.

Actually it is a regressive tendency; a return to a more primitive and archaic social organization, which will inevitably lead to the same injustice, tyranny and suffering which have existed recently in Germany and Italy. In spite of this, many persons of the so-callad intelligentsia wish to develop this type of organization, and cannot see what the consequences will be.—Dr. Karl Bowman, professor of psychiatry, University of California Medical School.

Northwest Association Begins New Year

Delegates to annual meeting elect James Polhemus, president; lay groundwork for further unification

Polhemus

WITH enthusiasm engendered by reports of constructive enterprise during the past year under President Patrick Johnson, Puget Sound Power & Light Co., delegates to the 39th annual meeting, Northwest Electric Light & Power Assn., in Seattle, July 17, laid the groundwork for another year of useful service by adopting a general program and electing as president for 1946-47 James H. Polhemus, president, Portland General Electric Co.

"With increasing participation by electrical manufacturers, distributors, dealers and contractors, we are laying the foundation of a unified electrical industry in this area," said Retiring-president Johnson. Our section meetings of engineers, accountants, salesmen and personnel people have been constructively in the public interest and there is much good to be accomplished for the industry in these fields of activity. President-elect Polhemus asserted that the association would take its cue from expressions at the meeting and expand this general program, seeking aid from the manufacturer and distributor members to invite greater participation by all these associated groups. He pointed out that this was the only organization in the Northwest set up to function as a common meeting ground for all branches of the industry, and that this would be a major objective during the coming year.

It was reported that the association's Research Advisory Service, instituted recently under Ladner V. Ross, director, with headquarters in Spokane, had completed most of the organizational details and was commencing to furnish service to industrial concerns through power company salesmen. Under this arrangement, production, processing, and marketing problems of Northwest industrials will be submitted for answer to one or more of some 900 cooperating research laboratories of government, college and private industry in the U. S., Canada and Great Britain. Eight utility company members of the association have combined to offer this service to their industrial customers.

Other officers elected at the annual meeting were vice-president, W. L. Thrailkill, Washington Water Power Co., and the following state vice-presidents: Idaho, C. J. Strike, Idaho Power Co.; Montana, J. E. Corette Jr., Montana Power Co.; Oregon, T. E. Roach, Northwestern Electric Co.; Utah, R. H. Ashworth, Utah Power & Light Co.; Washington, H. C. Webb, Puget Sound Power & Light Co., and British Columbia, T. M. Moran, B. C. Electric Railway Co.

Manufacturer, distributor, dealer and contractor delegates nominated, and the meeting elected the following to represent these groups on the executive committee: O. A. Alderman, McGraw Electric Co.; F. T. Brien, Graybar Electric Co.; G. Langtry Bell, Clarksons, Ltd., and R. D. Horning, Seattle Electrical Contractors Assn. Utility company representatives on the committee are: Patrick Johnson, Puget Sound Power & Light Co.; J. A. Hale, Utah Power & Light Co., and John C. Boyle, California Oregon Power Co.

After the meeting President Polhemus announced the appointment of the following section chairmen: Accounting and Business Practice, Henry Mann, Utah Power & Light Co.; Business Development, Henry Kruse, Puget Sound Power & Light Co.; Engineering and Operation, R. J. Davidson, Pacific Power & Light Co.; Personnel, L. W. Nims, Utah Power & Light Co.

Other appointments by the president are, Waldemar Seton, Portland General Electric Co., to be treasurer, and Berkeley Snow, executive secretary.

Personnel Conference

IN a final session of the 1945-46 administrative year, six committees of the NWEL&P Assn.'s Personnel Section reported in round-table conference at Salt Lake City during June, with Section Chairman R. H. Sessions, Idaho Power Co., in charge. A new subject, job analysis and evaluation took up one half-day session and a luncheon meeting. This was the section's second conference during the administrative year, bringing 23 personnel directors and members of their staffs from the member utility companies together, the largest number yet to attend any of the four conferences this section has held since it was established two years ago.

One company having recently completed a job analysis and evaluation, and with other companies now undertaking such studies or contemplating them, this subject received a major place on the program and evoked the chief interest of the group. O. A. Petersen, B. C. Electric Railway Co., first company to complete such a study, stated that it needed supervision and direction by an outside expert. It should also have the whole hearted support of top management, and then be sold down through the organization to all employees. In the B. C. company study, each employee was invited to aid in writing the description of his own job, but supervisors are responsible for the final job description agreed upon in their respective departments before applying the factors that lead to establishment of a point value for each job. Final evaluations of the better jobs are reviewed by a committee. Once established and agreed upon, the valuation should not be distorted, said Petersen. It must be defensible all the way up and down.

Jobs up to $6,000 per year were evaluated in the B. C. company and those employees found underpaid were raised, while no pay reductions were exacted from those who were overpaid. Considerable reorganization within departments followed, in which many of the originally overpaid employees were advanced to positions commensurate with their salaries.

Speaking at one of the luncheon meetings, J. P. Fleming, Ebasco Services, New York, now experting a job evaluation study for Utah Power & Light Co., defined the study as a systematic process by which the value of each job in relation to all other jobs in the organization can be determined. It eliminates inequities and establishes pay rates so that the wages at each level are correct in relation to wages at all other levels. It also makes cer-

tain that company wages meet employment competition by including in the program a survey of wages in the community. Factors used in the study being carried on by the Utah company were mental ability based on education, manual skill, physical ability, mental and visual attention, responsibility, contact with customers and public, and working conditions.

At a second luncheon meeting, Dr. A. S. Bennion, Utah Power & Light Co., threw out a challenge on the subject of human relations in industry by outlining the vast scope open to specialists in this field. He pointed to the scientific approach now being applied to personnel problems and made a plea that personnel directors never overlook the spiritual (not religious) needs of the employees. Although the values gained by adequate personnel direction are difficult to measure, they are none the less present and will pay off in the long run, he said.

Company practices with respect to sick leave and medical aid were reviewed by a committee of which L. W. Nims, Utah Power&Light Co., is chairman. Considerable variation in provisions for sick leave was found among the different companies and it was suggested that a measure of standardization on this point would be advisable. One company, having maintained a sick leave policy for monthly paid employees for many years, has recently written into its union contract similar provisions for hourly paid men.

Don Prairie, Northwestern Electric Co., chairman of the physical requirements committee, presented a summary of company practices on physical examinations, noting many differences in the physical standards required of workers. Difference of opinion developed over taking waivers, which have no legal standings in most of the states in the association territory. Likewise there was disagreement over informing a man why he is rejected for physical reasons. General consensus on this point, however, was that possible trouble is avoided by not telling a reject the specific reason for rejecting him.

Insurance and pensions continued a live topic, with Kimball Jack and Leonard Stirn of the Washington Water Power Co. leading the discussion. There was general agreement that if a pension plan is participated in by employees, it should be carried by an insurance company, but if the company pays all the cost, the plan should be a trusteed plan. R. H. Sessions pointed out that utilities ought to have a big program of pensions. Public regulation limits the extent to which wages and salaries may be raised, but the public could be expected to go along with the company on a pension plan. Now that the manpower situation has eased up with the return of veterans, most of the companies are looking toward retiring their older men at 65, some of whom had been asked to stay on active duty during the war period.

Snow Sessions

Discussions of the accident prevention committee under J. T. Bradshaw, Puget Sound Power & Light Co., chairman, centered around conduct of safety meetings and the programs for such meetings. Some companies are training supervisors and foremen in programming and conducting these meetings, so that they can be made more interesting to the men. Accident clinics and investigations of accidents were said to have been found helpful. T. W. Lowry, Portland General Electric Co., told of a school conducted for department heads on one afternoon a week for 20 weeks, to give these people the complete background on accident prevention. This course, coupled with foremen's dinner meetings, has proved helpful. Off-the-job accidents were recognized as a vital part of the program and means were sought of carrying the safety message into the home.

A new committee on personnel forms got a start at this conference through a discussion by J. A. Yates, Pacific Power & Light Co. Yates outlined the scope of personnel functions, pointing out the information needed by the department. Forms of the different companies were exchanged, and in the committee's future deliberation emphasis will be on the use of a minimum number of forms and a comparison of forms used by different companies for similar purposes.

Employee welfare, including educational programs, recreation, company camps, athletics, sick calls, flowers, and similar activities were reviewed in the discussions of the planning committee, headed by C. W. Sherman, Puget Sound Power & Light Co., chairman, indicating a liberal indulgence by all the companies in these activities. The Utah Power & Light Co. has listed on one sheet a summary of employee benefit plans, involving benefits under 13 headings, the average cost of which to the company is $46 per employee per month.

Under employee training, Sherman told of making a special arrangement with the union for an intensive training course for linemen. This was found necessary because of the shortage of trained linemen in the area and the inability of the union to furnish men on demand. The course, streamlined in 13

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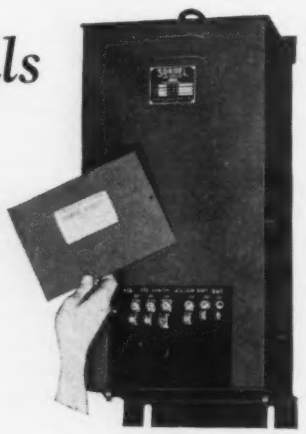

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weeks, is conducted by foremen at a special training ground where lines are built and all kinds of line work are practiced.

Sherman's committee likewise considered the problem of the returning veteran. No serious problem has developed in connection with rehiring returned veterans. Most companies are expanding their operations and readily absorbing not only their own veterans, but also their share of the younger veterans who went direct from school into the armed services.

NECA Meeting

Division No. 5 of the National Electrical Contractors Assn. and IBEW will hold their Vice-president's meeting at Manitou Springs, Colo., Aug. 28-30. Busiest man in the eight states encompassed by NECA's fifth district is Pat Price, secretary of the Rocky Mountain Chapter NECA, Denver, who is in charge of arrangements. Reservations pouring in for accommodations at the Cliff House during the convention presage one of the largest gatherings in the organization's history.

A tentative program includes the following speakers: Simon Halle, Colorado Springs; W. B. Clayton. vice-president General Electric company; Meryl Mentzer, field representative, Rocky Mountain Electrical League; George Seaman, NECA, Fort Worth, Texas; Les Allen, NECA, Tulsa, Okla.; Hon. John C. Vivian, governor of Colorado; Cliff Noxon, Department of Labor, apprenticeship training division, Denver; Gaylord B. Buck, vice-president Public Service Co. of Colorado; Ralph Johnson, Denver electrical contractor; Ralph Ashley, Chicago, Ill; Ed. Brown, IBEW.

The event will be enlivened by trips up Pike's Peak, through the Golden Cycle mill and to various nearby points of interest.

Many of the conventioneers planned to visit vacation areas in the Rocky Mountain region following adjournment; others are expected to remain for the Pike's Peak auto racing classic Sept. 2.

● Rocky Mountain Electrical League will hold its annual convention in prewar style at the Stanley Hotel, Estes Park, Sept. 5-7. Reservations being received at league headquarters in the Gas & Electric Bldg., Denver, indicate a record turnout. Arrangements are being made for speakers of national prominence, according to Lou Goalby, chairman of the program committee. Harold T. Rankin is general chairman of the convention. Herb Names is in charge of entertainment arrangements.

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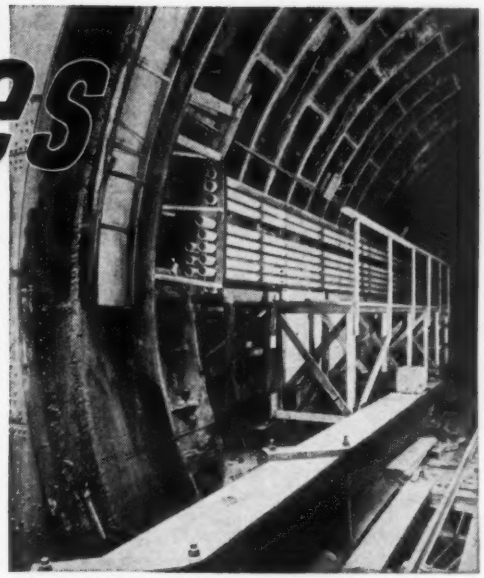

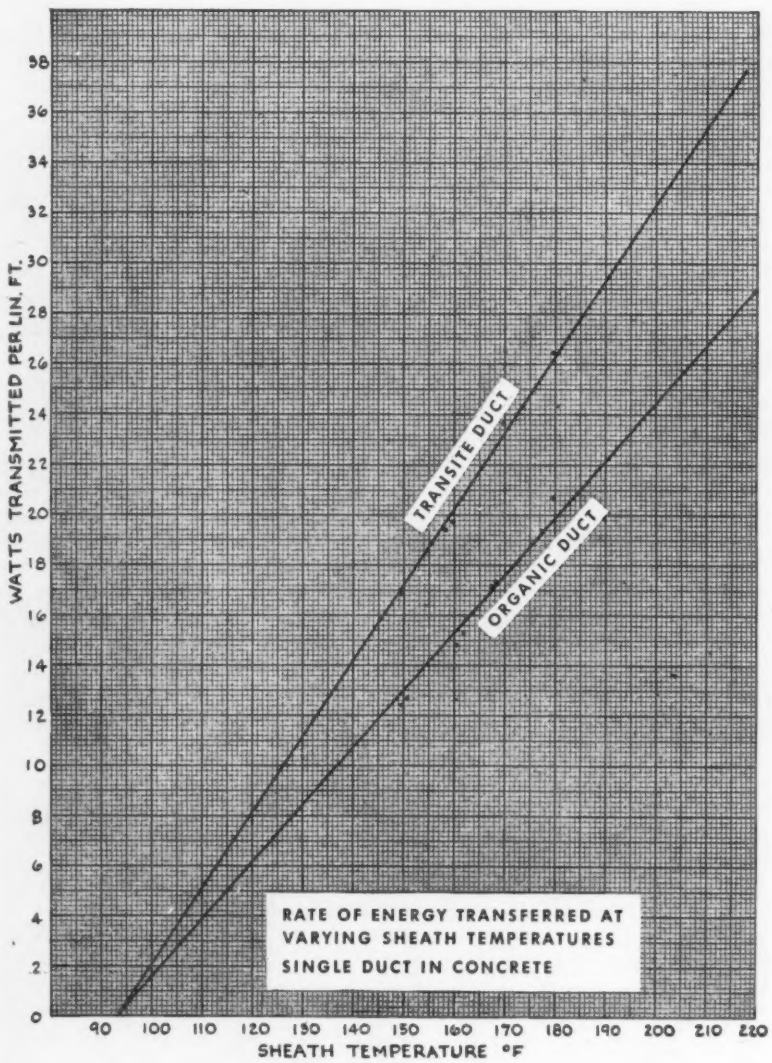

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PCEA *Panorama* — *Edited by A. X. Schilling*

Uniform Code Promoted

ACTIVE cooperation in promoting the PCEA Uniform Electrical Code was pledged by representatives of the League of California Cities as a result of a meeting held in Los Angeles on May 21. The meeting was arranged by Victor W. Hartley, PCEA managing director, to enable the league representatives to discuss the code and its enacting ordinance with members of the National Electrical Manufacturers Assn. The enacting ordinance sponsored by PCEA differs from the one endorsed by NEMA in the use of the *prima facie* evidence clause and the reasons for the variance were explained to the NEMA representatives by the California lawyers.

Following the meeting, Richard Carpenter of Sacramento, legal counsel for the League of California Cities, expressed his enthusiasm to Hartley and said: "The gentlemen present with me at the meeting felt as I did that, if all our meetings with other groups could be as congenial as was the meeting with your group, there is little that we could not accomplish. We will always be happy to assist you in your efforts to secure enactment of uniform safety standards."

Present at the meeting were R. R. Irvine, NEMA legal counsel, and W. J. Donald, NEMA managing director. The League of California Cities was represented by the following selected delegates: C. M. Ozias, city attorney of Fresno; Clyde Woodworth, city attorney of South Gate, El Segundo, Inglewood and Manhattan Beach; Louis H. Burke, city attorney of Montebello; Christopher H. Griffin, city attorney of Huntington Park; Richard C. Waltz, city attorney of Beverly Hills; M. Tellefson, city attorney of Culver City and Hermosa Beach; Royal M. Sorensen, deputy city attorney of Pasadena, and William H. Neal, assistant city attorney of Los Angeles. M. G. Sues, chairman of the code and ordinance committee, and Victor W. Hartley, managing director, represented PCEA, while Walter C. Smith attended in his dual capacity as a member of the code and ordinance committee and Pacific Coast representative of NEMA's uniform legislation department.

The new revised Uniform Electrical Code, the association's first revision since 1941, will be based on the National Electrical Code and will be issued after the national code is finally approved some time this fall. The new revision will cover the new materials and methods developed during the war years, which have been handled on an interim basis under emergency ordinances.

Directors Meet

The association's new president, Milt G. Sanders, vice-president in charge of sales for the Central Arizona Light and Power Co., Phoenix, sounded the gavel for his first board of directors' meeting on July 12 in Los Angeles. The board elected Ralph Walbridge, whose term as a board member expired June 30, to serve another year to fill the vacancy created by Sanders' election to presidency, and re-elected M. G. Sues vice-president, representing the Southern Section. A. G. Jones was elected vice-president, representing the Northern Section.

The board approved the recommendation of the code and ordinance committee to the effect that the PCEA staff be authorized to take the initiative in promoting the Uniform Electrical Code in counties where there is evidence of code activities or where code activities appear to be likely in the near future. This will parallel the staffs' work in cities.

The board also approved the code and ordinance's recommendation that a letter be sent to all county attorneys with a copy of the recently adopted Santa Clara County ordinance, calling attention to that ordinance as being a highly desirable pattern to be followed by counties contemplating such legislation. By reference, the Santa Clara County ordinance adopts the Uniform Electrical Code, the Uniform Building Code and the Uniform Plumbing Code. It exempts from its provisions strictly agricultural property of two and a half acres or more, including homes thereon, but owners of such property are enabled to apply for inspection at the regular inspection fees should they so desire.

Appreciation for the splendid work performed by I. W. Borda as general chairman and by the various committee chairmen in making the recent convention an outstanding success was expressed by the board, which directed that communications to this effect be sent to Borda and his committee heads.

Approval was voted for Sanders' recommendation for the creation of an advisory committee to be composed of the chairman and vice-chairman of the guidance committee of each of the association's three sections. The purpose of the advisory committee is to more closely integrate the operation of the sections and avoid overlapping and parallel activities. Its first meeting was set for July 23.

The board recommended that the business information committee establish a plan to accumulate industry information for the purpose of informing company members of literature available for distribution to individual members within the companies. Approval was also voted for a committee to communicate with educational authorities with a view to re-establishing the prewar classes in farm electrification at California Polytechnic, San Luis Obispo, during the summer sessions for agricultural instructors.

Recommendations of outgoing committees were considered and referred to the new committees with authorization to adopt them should the new committees find them desirable.

● L. D. PRICE of New York City, manager of the NEMA uniform legislation department, is expected to attend the annual meeting of the Southwestern Section of IAEI, scheduled to be held in Sacramento on Sept. 30 and Oct. 1 and 2. Members of the code and ordinance committee plan to discuss technical phases of the Uniform Electrical Code with Price during his visit to California.

Although both retired, Ben Hill, left, IAEI president, and Martin Sandles, Southwestern Section president, both of Oakland, will preside at the annual meeting in Sacramento, Sept. 30-Oct. 2, after long careers as inspectors

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OREGON CITIES PROTEST PUD-REA PURCHASE PLAN

A PUD-REA plan to take over private utility properties in Union County (Ore.) hit a snag last month, when suit was filed in circuit court at Salem to have the purchase proposal declared illegal. Plaintiffs included the cities of Island City and Elgin (which voted themselves out of the PUD when it was formed in 1940) and several individuals.

Charging that the joint operation is contrary to law, the complaint asked that a financing bond issue be declared void. The court also was asked to forbid the PUD to purchase only a part of the system in the county and to order the question of financing loans to be submitted to the voters.

The PUD-REA combine was arranged to secure sufficient funds to pay the price (approximately $1,250,000) asked for the properties by California-Pacific Utilities Co., which took over the former Eastern Oregon Light & Power system on July 1. (EWEST, July, p. 94). The PUD was authorized to raise $925,000. (District voters in November 1942 approved a $925,000 bond issue after defeating a similar proposal in May 1942). The remainder of the purchase price was to be secured by the recently organized Union County Electric Inc. through an REA loan.

Although not a party to the suit, the city of Cove showed a disposition to have the set-up clarified. On the suggestion that the PUD would confine its activities to LaGrande and leave the rest of the county to the co-op, Mayor Robert Bond of Cove pointed out that the city had granted the PUD a 20-year franchise containing a proviso prohibiting transfer to any other operator of utility properties.

Mayor Merton Kiddle of Island City pointed out that the whole district voted the bonds because they were told that the $925,000 would buy and operate the entire system. He continued: "Now the PUD, without authority from the people has decided to kick out the small farmers whose votes carried the bonds along with the smaller communities and to confine its ownership to LaGrande, an area over 100 times smaller than the remainder of the district, but the producer of almost two-thirds of the revenues. The big area the PUD leaves to its step child, the cooperative, where there is little revenue but where all the expensive line extensions to farms must be made and paid for by the cooperative alone. It simply cannot be done. It would be silly for 1,880 light users to try it. Bankruptcy would be inevitable and, very important, with two separate corporations operating in divided territory, service necessarily would grow steadily worse."

Meanwhile it was announced that Union County taxpayers living within the confines of the PUD would be assessed $15,000 this year under terms of the PUD budget. This is the third assessment against the taxpayers of the district since formation of the PUD. In previous years the budget asked only for a one-mill assessment and did not name a specific amount of cash, but the amount collected was approximately $15,000, according to Lee Reynolds, county assessor.

Initiative 166 Will Go On Washington State Ballot

Initiative 166, a measure which would curb the power of PUD commissioners, is assured of a place on the Washington state ballot. Last to be filed this year and first to be returned to the Secretary of State for checking, the initiative was said to contain 90,000 signatures, 40,000 above the number required to place it on the ballot.

If passed, the measure would amend the state PUD law to require a vote of the people before issuance of bonds for purchase of private utility properties. The present PUD law permits PUD commissioners to issue bonds and buy power systems without approval of the electorate.

The proposal carries a provision that pending purchases would not be affected. Whether the Puget Power purchase would come under its provisions is a moot question. If the deal is actually in the making, Initiative 166 would not affect it. If no move has been made, other than the present court litigation, probably a public vote would be required under the proposed law.

● FRANCHISE request of Portland General Electric Co. in West Salem, Ore. will appear on the city's November election ballot, it was announced following certification of petition signatures. The city council twice in the past few months has tabled a proposed ordinance which would have granted the company a franchise without necessity of a public vote. PGE has been operating in the city without a franchise since a former one expired in 1939.

NORTHWESTERN, PACIFIC FILE MERGER PROPOSAL

Proposal for merger of Northwestern Electric and Pacific Power & Light companies was filed last month with SEC by American Power & Light Co. and hearing was scheduled for Aug. 13. The plan also must be approved by FPC and Oregon and Washington public utility commissions and must have the consent of the Portland city council.

Under the proposal, capital stock of Pacific, (into which Northwestern would be merged) would consist of 100,000 shares of new preferred stock, $10 million par value, and 500,000 shares of new common stock, $10 million par value.

Present preferred stocks of both companies would be converted into new preferred stock on Pacific, with a cash adjustment share for share. The preferred shares would be offered for competitive bidding, the bidder agreeing to purchase all shares not required for conversion. Bids would cover the dividend rate, public offering price and amount to be paid by the bidder.

The common stock of both companies, now held by American Power & Light, would be surrendered in exchange for new common stock of Pacific and the holding company would make a cash contribution of $2,200,000 to the capital of the merged companies.

It is then proposed to refinance the indebtedness of Pacific, including the bonds and debentures of Northwestern to be assumed by Pacific.

Condemnation Jury Sets Valuation in PUD Suit

A federal district court jury set a $1,265,000 valuation on Benton County (Wash.) properties of Pacific Power & Light Co. in condemnation proceedings instituted by Benton County PUD. The figure is nearly 2½ times the valuation of from $540,000 to $590,000 placed on the properties by PUD witnesses. Company witnesses asked $1,500,000 plus $335,000 severance damages.

In handing the case to the jury, Judge Sam M. Driver instructed them to fix just compensation plus severance damage and to give no weight to public versus private power arguments. The PUD has a "reasonable time," probably one year, in which to decide whether or not to buy the system.

SET TO GO

...Quicker!

FM RADIO

G-E 60-watt De luxe Desk Console 30-40 mc.

THIS 60-watt FM De luxe Desk Console is a new unit in the complete line of the G-E 2-way radio dispatching equipment—with important improvements in control, metering, ease of installation, and styling.

- Two multi-purpose meters, with selector switches, make it easy to check all important transmitter circuit and receiver circuit functions.
- Desk-stand or floating arm dynamic microphone.
- All interconnections are factory-assembled. Only one antenna lead, one power cord, and one microphone cable to plug in.
- *Alnico V* permanent magnet 6-inch speaker—protected by new grille.
- Panel-mounted cyclometer-type electric clock for convenience in making log entries.
- Selector switches, "on-off" switch, indicating lights, receiver squelch and gain controls are panel-mounted and clearly labeled for quick reading.
- Hinged top cover allows easy inspection and servicing. Key lock for security and protection.
- *New*, good-looking cabinet, heavy-gauge steel construction, rounded edges, *new* high lustre blue-gray finish.

The new G-E 60-watt De luxe Desk Console includes all these improvements with *better coverage, increased range, reliability, low overall maintenance,* plus the time-proved features that have made G-E FM police radio famous.

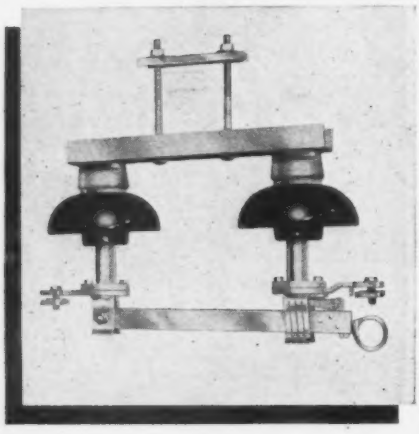
G-E radio engineers are located in principal cities. For complete information and assistance in planning your utility radio dispatching system, write or call the nearest General Electric office or the *Electronics Department, Section 720A, General Electric Company, Syracuse 1, N.Y.*

FIRST AND GREATEST NAME IN ELECTRONICS

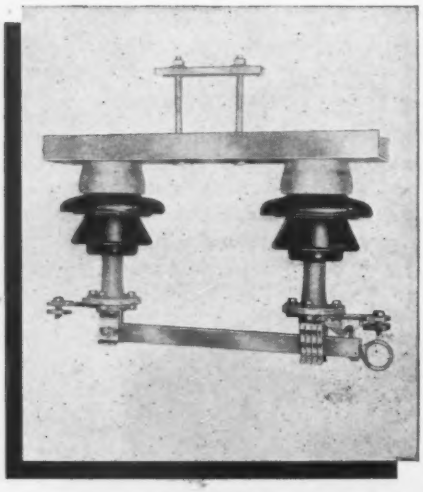
GENERAL ELECTRIC

183-EE-6918

MATTHEWS DISCONNECTING SWITCHES



Available in ratings of 7.5, 15 and 23 KV., 200 and 400 amperes. These hook operated switches are well constructed and have large blades and positive contacts which prevents any overheating at full rated load. All 200 ampere rated switches are furnished with single blades while the 400 ampere switches have double blades and can be supplied with or without blade latches. They are adaptable for horizontal or vertical mounting and can also be supplied with NEMA rated insulators as shown below.



Write for Bulletin 106

W. N. MATTHEWS CORP.
3722 FOREST PARK BLVD.
ST. LOUIS 8, MO.

COURT REFUSES TO REVIEW RATE STUDY DECISION

The Arizona Supreme Court has refused a rehearing on its ruling that a $50,000 legislative appropriation for a rate study cannot be subjected to a referendum vote next November. Henderson Stockton, appellant, said that a U. S. Supreme Court hearing of the case will be asked.

Stockton and Wilmot W. Trew, attorneys, filed suit to force Secretary of State Dan E. Garvey to certify 12,000 signatures petitioning a referendum on the survey appropriation, authorized at a special session last fall.

The decisions, which reversed a superior court ruling, declared that the appropriation was for the support and maintenance of a state department, the Arizona Corporation Commission, and was not referrable.

Authorization of the rate survey ended a four-year quest by Gov. Sidney P. Osborn. The act directed the corporation commission to borrow experts from FPC to help in the probe of state power rates, said to be the third highest in the nation.

Resources Board Urges Return of CVP to State

Opposition to establishment of regional authorities for federal control of water resources and recommendation that the Central Valley project be returned to the state were voiced by the California Water Resources Board in a recent resolution.

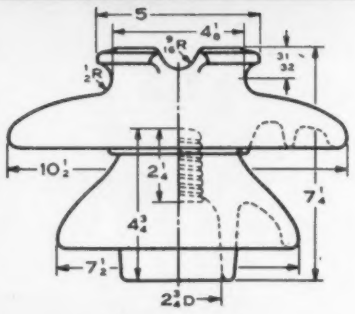
The resolution commended a statement by Secretary of the Interior J. A. Krug before a congressional committee in which he was quoted as saying: "A waterway that is primarily within a single state might better be developed by a state authority than by having the federal government in it at all, except perhaps in helping out with finances or something like that."

Gov. Earl Warren was urged in the resolution to take a firm stand for local and state control of maintenance and operation of Army flood control projects.

The board was created by the 1945 legislative session to coordinate development of water resources in the state.

● Arizona Corporation Commission has authorized an $8,500,000 issue of first mortgage bonds by Central Arizona Light & Power Co. E. H. Coe, company president, reported that $6,500,000 would be in 2¾% refunding bonds which will retire outstanding 3¾% bonds. The balance will be used for new property and equipment, he said.

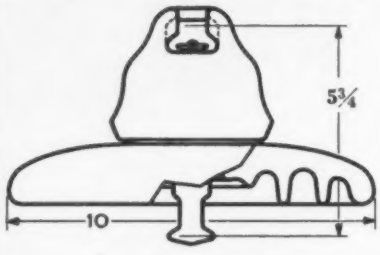
THOMAS PORCELAIN INSULATORS



NO. 2124-M
45 Kv. Rating

Dry Flashover	125 Kv.
Wet Flashover	85 Kv.
Rec. Pin Height	8 In.
Std. Pkg. Crate	6

This insulator generally used on 33 Kv. can also be furnished in one-piece design (No. 1924). Mechanical, thermal and electrical characteristics are well balanced insuring long life in service.



NO. 21243
15,000 Lb. Min. Combined M. & E. Rating

Dry Flashover	80 Kv.
Wet Flashover	50 Kv.
Leakage Distance	11½ In.
Std. Pkg. Crate	6

This design is offered in a wide range of spacings in both Ball-Socket and Clevis types which fulfill all strain insulator requirements.

● Service records prove these units will serve faithfully under all conditions. Call our nearest sales representative for speedy delivery.

WESTERN REPRESENTATIVES

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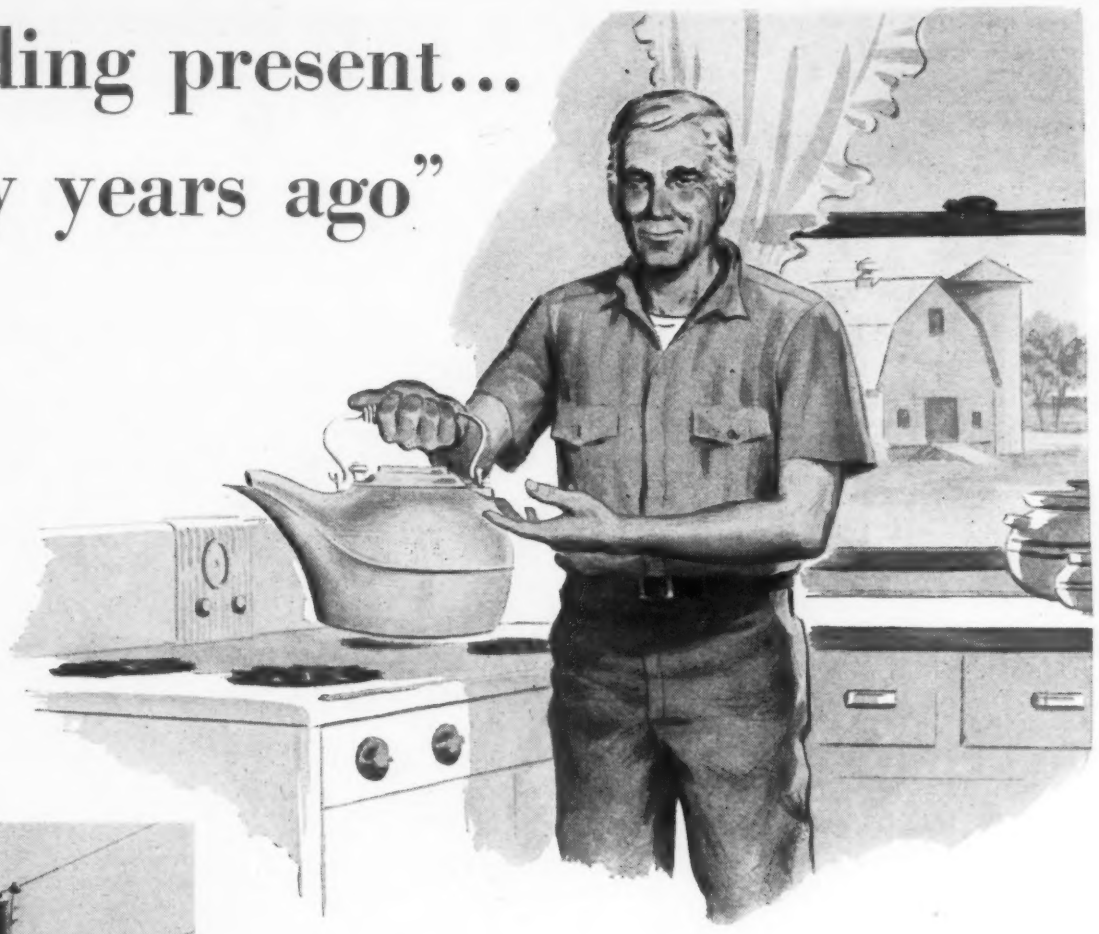
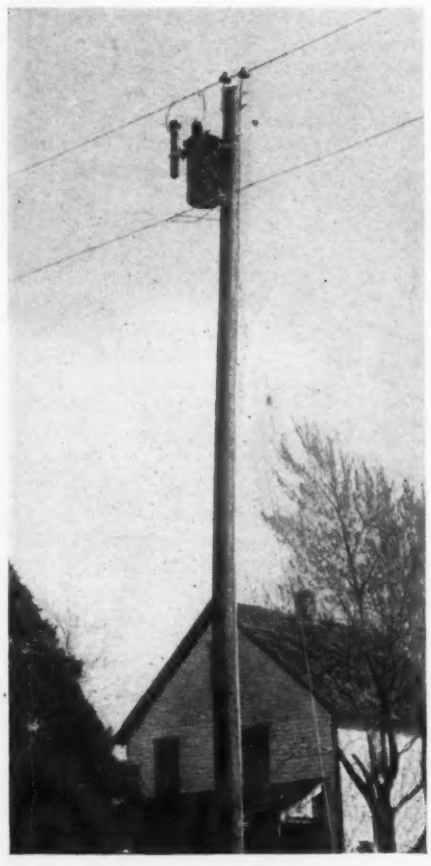
San Francisco	Geo. E. Honn Co.
Seattle	Ken H. Best
Phoenix	J. E. Redmond Co.
Denver	R. F. Hamilton & Assoc.

THE R. THOMAS & SONS CO.
LISBON, OHIO

"Wedding present... forty years ago"





Thus a line foreman answered his own question . . .

"How durable is aluminum?"

That same enduring quality is present in the Alcoa A.C.S.R. you're considering for your new power line. The aluminum used in these conductors is even purer, however, than in that old kettle. This gives it the high electrical conductivity desired in a power line.

Alcoa engineers will help you design that line to provide for future growth of electrical loads, while also holding first costs to an economical low. For this help, get in touch with the nearby Alcoa office. Or write ALUMINUM COMPANY OF AMERICA, 2132 Gulf Building, Pittsburgh 19, Pennsylvania.

ALCOA A-C-S-R
ALUMINUM CABLE STEEL REINFORCED

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NICHROME* & NICHROME V for winding large value resistors where space factors call for compactness in design without sacrificing dependability. Available in all shapes and sizes drawn down to the extremely fine gauge of .001" diameter—67 miles to the pound.

Also the time-tested standard alloys for all vitreous enamel resistor requirements due to the complete absence of occluded gases. NICHROME V is particularly recommended when a more constant resistance at variable temperatures is specified.

ADVANCE* for winding precision resistors used in electric meters and laboratory testing devices. In finer sizes its negligible temperature co-efficient of resistance (±.00002) combined with high resistivity makes it the most desired alloy for this use.

MANGANIN for precision bobbins, Wheatstone Bridges, Decade Resistance Boxes, Potentiometers and National Bureau of Standards type resistance standards which require fixed stability and constant resistance under normally variable operating conditions and negligible thermal e.m.f. against copper.

In addition to these we manufacture over 80 different electrical heat and corrosion-resistant alloys. If your resistance requirements are different tell us about them and depend on it . . . Driver-Harris will develop the alloy best suited to your specifications.

Driver-Harris COMPANY

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Just connect wires, screw to outlet box and the job's done—in a few minutes. Fits standard 4" or 3¼" outlet box or plaster ring. Self-grounding—you can use 2-wire cord and plug. Complete with receptacle, two 5-foot chains, "S" hooks and cord clips. Nothing else to buy.

$1.50 Each List

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905

*Patent No. D-141024. Others pending. Underwriters approved.

IT'S EASY TO SEE WHEN IT'S DAY-BRITE Lighting

HONOLULU UTILITIES MAY CALL GENERAL STRIKE

Protesting company support of an employers council, Hawaiian Electric Co. employees joined Honolulu gas, telephone and transit company workers in threatening a 24-hour walkout on Aug. 1 "or any other day." The strike vote contained a clause which would make possible a tie-up beyond the 24-hour period.

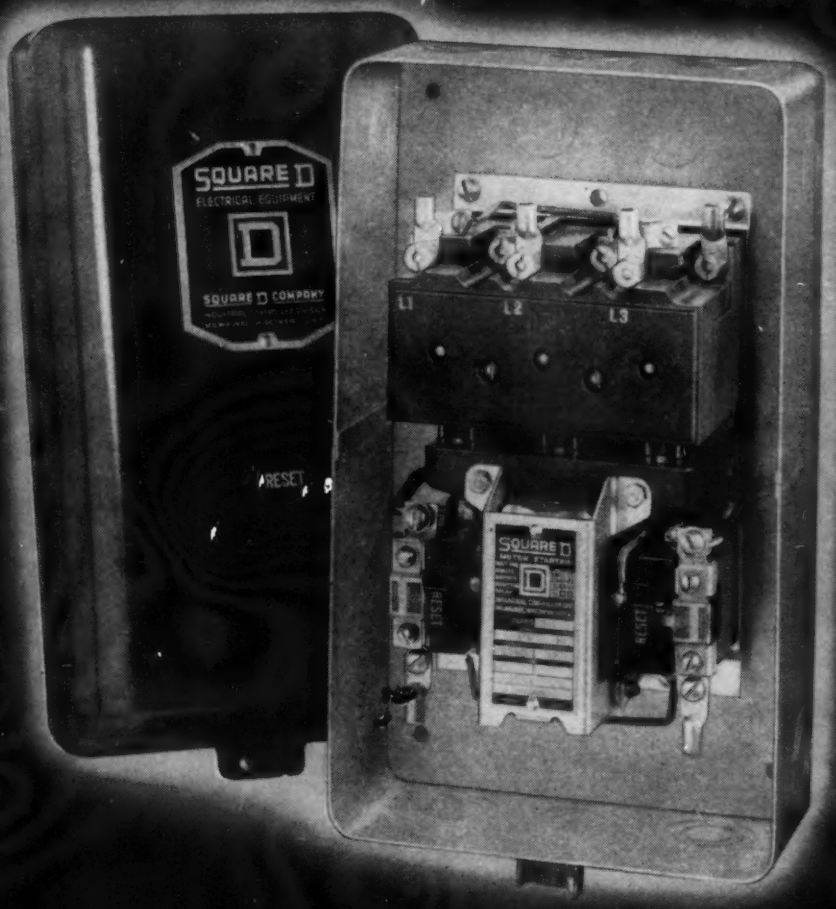
In face of the threat, President Leslie A. Hicks of Hawaiian Electric and officers of the three other utilities issued a joint statement, telling the consequences of a general strike and urging citizens to do everything possible to guard themselves in advance. Listed results of a utility strike were: no refrigeration; ice shortage; hospitals paralyzed; public health threatened, with danger of epidemic; water shortage, complete stoppage in many areas; sewage disposal blockade; no lighting, cooking or water heating by electricity or gas; no street or traffic lights; food spoilage; gas stoppage within a few hours; no public transportation; telephone service stopped; fire protection hampered; police protection curtailed; no milk supply; bakeries closed; gasoline stoppage; restaurants. laundries and dry cleaning plants closed; industrial plants and canneries closed.

"So far as we know, no American city has ever suffered a complete public utilities strike," the statement said. "Honolulu is the last city on earth where such a strike should be called. When any other city becomes uninhabitable, it is possible to evacuate the people to other cities, but there is no other place for our people to go. In bombed European cities where only the sewage system was put out of commission, the city was uninhabitable in 24 hours . . . "

● TWENTY PICKETS were fined $500 each in Los Angeles municipal court recently for participation in a mass picketing riot at the U. S. Motors plant Jan. 17 during a CIO United Electrical and Machine Workers' strike. The 20 were found guilty of three violations each and ordered to pay the $500 or serve 50 days in jail. They were denied motions for a new trial and for an arrest of judgment. One of the fined persons, a CIO union official, said the union was paying the fines.

● NATIONAL LABOR RELATIONS Board has ordered an election within 30 days of July 2 in which system dispatchers in the central load dispatching office of Pacific Gas and Electric Co. will vote for or against representation by the Utility Workers' Union of America, CIO.

Performance Plus



Class 8536 A. C. Magnetic Starter — one of a complete line of Square D starters available in a wide range of sizes and enclosures.

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They are simply designed. Magnet coils, contacts and overload relays can be changed quickly, without disturbing external connections. They are compact, yet afford generous wiring space and easy-to-reach terminals. Installation and inspection are faster and easier. And—completeness of line (both A. C. and D. C.) means the right starter for any given application.

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Lenk
● SAFE
● SURE
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DISPLAY THEM!
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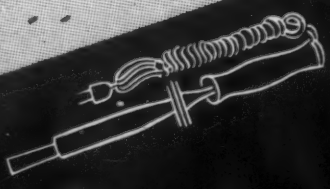

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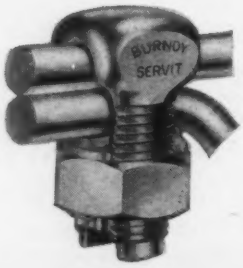


Southern California and Arizona Representatives
Earl S. Condon Co., represents: UNITED STATES RUBBER CO. Wire and Cable Div. LAPP INSULATOR CO., INC. ■ BURNDY ENGINEERING CO., INC. ■ COLE ELECTRIC CO.

PG AND E TO ENLARGE SAN FRANCISCO PLANT

Pacific Gas and Electric Co. has announced that it will spend $19,000,000 to enlarge generating capacity of its Station P steam plant in San Francisco. The expansion will make the station the largest of the companies' 13 steam plants.

According to Norman R. Sutherland, San Francisco division manager, the company will install two 100,500-hp turbogenerators, bringing capacity to 263,000 hp., more than four times present capacity. To house the new units, a $1,870,000 building will be erected adjacent to existing structures.

The generators will be hydrogen cooled, will operate at 3,600 r.p.m., with a pressure of 1,500 lb. at 900°F. Steam will be provided by four outdoor boilers, each with a normal capacity of 450,000 lb. of steam per hour.

The new facilities are expected to be in operation late in 1948. Enlargement of the plant was originally scheduled for 1941 but was delayed by war shortages.

Contracts Let for Harbor Steam Plant Additions

Contracts for additions to its Harbor steam plant have been let by Los Angeles Board of Water & Power Commissioners.

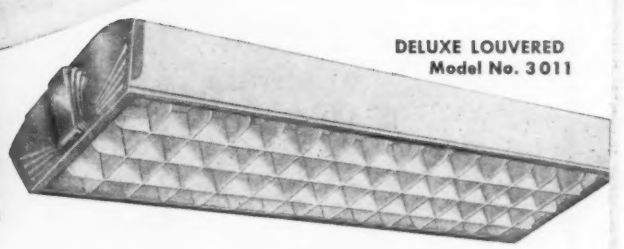
General Electric and Westinghouse Corp. have received awards totaling $3,571,000 for three 75,000-kw. generators to be installed by late 1949. Boilers will be furnished by the Riley Stoker Corp. on a $2,064,586 contract. Built to burn either gas or oil, they will occupy a 68x46-ft. ground area and will be 85 ft. high.

An addition to the present Harbor plant will be built immediately to house a 65,000-kw. unit, replacing one leased from Southern California Edison's Long Beach plant. A $494,179 contract for the concrete structure has been let to the Guy F. Atkinson Co.

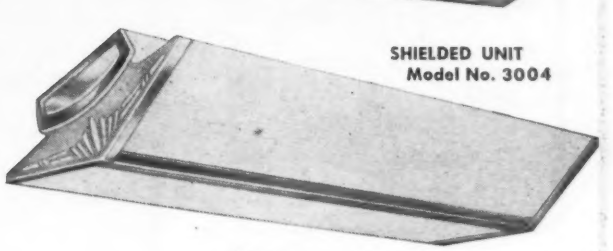
General Manager Samuel B. Morris and Charles P. Garman, chief electrical engineer, recently informed the Board of Water & Power Commissioners that the anticipated decrease in power demand after V-J Day did not materialize; that industrial peak demand registered only a slight drop, while residential and commercial loads increased sharply and are continuing to rise.

● Pacific Power & Light Co. has started reconstruction of its Naches (Wash.) plant, severely damaged by fire in May 1945. Cost of the reconstruction is estimated at $250,000.

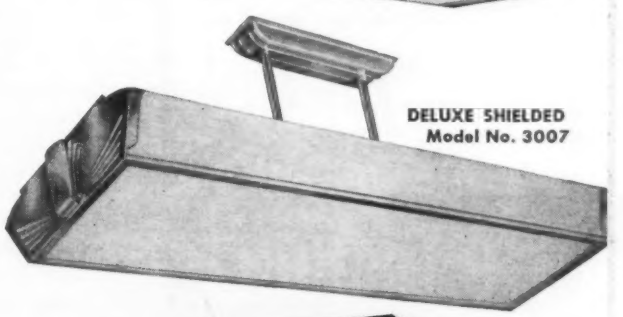
You Take the Lead in Commercial Lighting Service with the New Complete MITCHELL LINE



DELUXE LOUVERED
Model No. 3011



SHIELDED UNIT
Model No. 3004



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With new designs, new features, in a complete line of 2-light and 4-light Luminaires . . . MITCHELL blazes the trail for you to new standards of lighting service! More than a dozen vital advantages enable you to answer every commercial lighting need. They help you provide new lighting comfort and efficiency, new style and beauty, for every type of application. Backed by nation-wide MITCHELL acceptance . . . they give you today's strongest selling line . . . turn more prospects into more sales. As a result, you achieve undisputed leadership in your market . . . you build a bigger, more successful lighting department.

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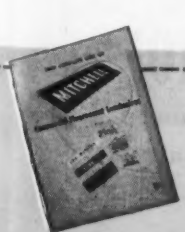

Get New Catalog No. 285
Illustrates and describes the complete line of Commercial Luminaires. Includes helpful lighting data and servicing information. Write for it now.

See Our Catalog in Sweet's
For convenient reference, Mitchell Commercial and Industrial units are cataloged in Sweet's 1946 Architectural and Mechanical Industries Files.

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Store Window Lighting • Spotlights and Floodlights • Desk Lamp
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Spauldite (Laminated bakelite) Sheet, Rod & Tube.
Spauldite Washers and fabricated parts.
Spauldite Gear Blanks.
Spauldo Slot Insulation.
Vulcanized Fibre Sheet, Rod & Tube.
Formed Fibre Slot Wedges.
Fibre Washers & Fabricated Parts.
Fibre Receptacles.
Armite (Fishpaper) Plain or Gummed.
Friction and SoftBoard

THE MACALLEN CO.
Compressed Mica Sheet, Tube, Washers & Specialties.
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THE HOPE WEBBING COMPANY, INC.
Cotton & Linen Finish Electric Tables, Webbings & Sleevings.

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ARIZONA COMPANY WILL INCREASE CAPACITY

Enlarging on original expansion plans for its Phoenix steam plant, Central Arizona Light & Power Co. has announced that it will spend $2,750,000 for a 33,000-kw addition to generating facilities. Earlier plans (EWEST, June, p. 130) called for a 25,000-kw. installation.

According to L. K. Doutrick, vice-president and general manager, the addition will bring total capacity of the Phoenix plant to 77,000 kw., making it one of the largest plants of its kind in the southwest.

The 33,000-kw., 3,600-r.p.m. turbo-generator is being built by General Electric and a structure to house it will be started about Oct. 1. A 900-lb gas and oil fired boiler will furnish steam for the generator. It will use a special upright cooling tower to lower condensing water temperatures. About 32,000 g.p.m. will be circulated through the condenser and over the cooling tower to condense the steam from the turbine back into water for reuse in the boiler.

Doutrick said that present power sources are expected to be more than adequate to meet customer demands until the summer of 1948. The company is negotiating with the Arizona Power Authority for a substantial block of power which it hopes will be available by 1949, he said.

The Phoenix plant, originally built as a standby unit, has undergone four major expansion programs since it was put into service in 1930. Capacity was originally 15,000 kw.

Lucky Peak Reservoir in Flood Control Bill

Included in the Omnibus Flood Control Bill enacted recently is the Lucky Peak Reservoir on the Boise River, ten miles upstream from Boise, Idaho. Although no generating capacity will be installed at Lucky Peak, construction of the reservoir will allow the installation of a 13,000-kw. plant at Arrowrock Dam farther upstream on the Boise River. Arrowrock Dam has been in operation since 1915. It is located 13 miles above the Lucky Peak site.

● REPRESENTATIVES of the General Engineering Co., Seattle, have started a field survey of proposed transmission lines extending from the Detroit Dam site to Chemawa for the Bonneville Power Administration, the company reported. The survey is expected to be completed in three months, C. E. Drysdale, company engineer, said.

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Provide the Right Answer to Your Telemetering Problems

- Voltage
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CONTROL CORPORATION
718 Central Avenue
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MORE UNITS PLANNED FOR COLORADO STEAM PLANT

Public Service Company of Colorado, through its president, John E. Loiseau, has announced plans to spend more than $500,000 to increase by almost 100% electric generating capacity of its steam plant at Alamosa, in the San Luis Valley.

Increasing industrial and domestic demands of the region have been stimulated during and since the war period, Loiseau said.

The present capacity of the Alamosa plant is 5,750 kw. It will be augmented by installation of a new 5,000-kw. high-pressure steam turbine, boiler, cooling towers, condensers and auxiliary equipment at an estimated cost of $530,000.

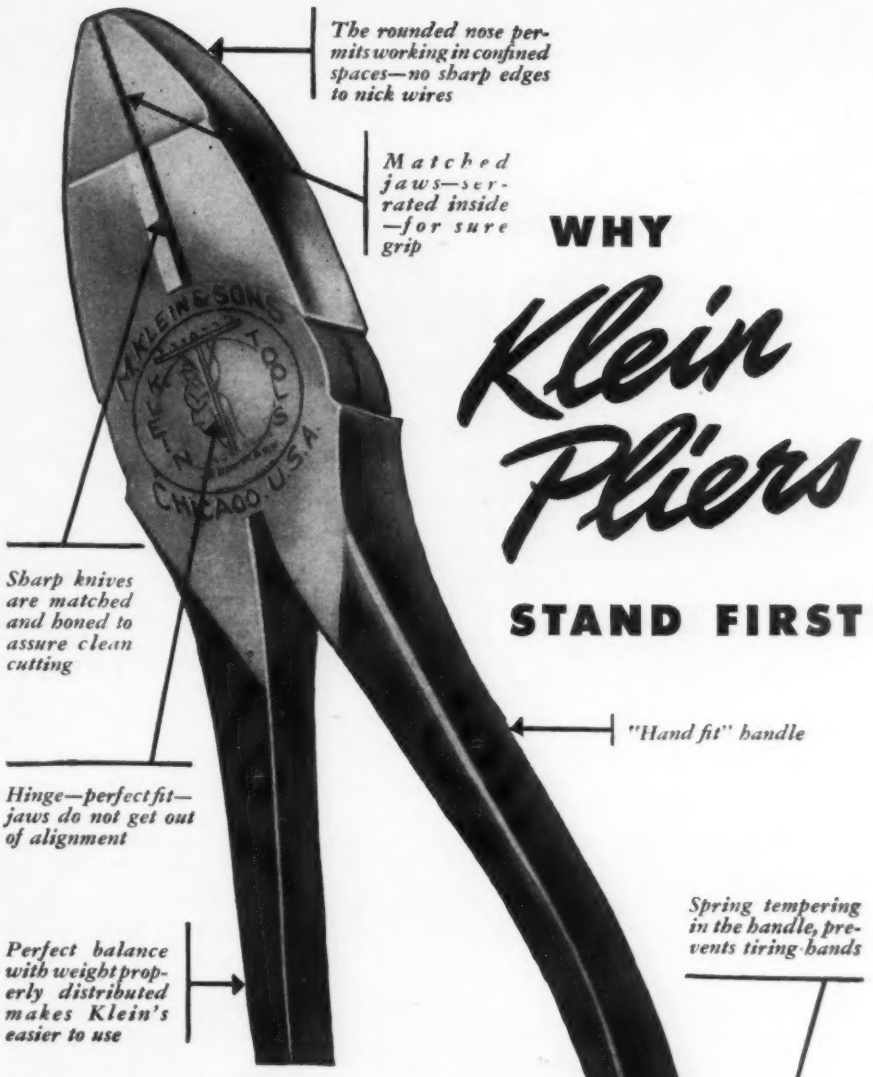
Stearns-Roger Mfg. Co. of Denver will be construction engineers on the job and present plans call for completion in the summer of 1947. Delivery of the new turbine at Alamosa is tentatively scheduled by the manufacturer for the spring of 1947.

The area to be served on a stepped-up scale is one of the state's most prosperous agricultural and livestock sections. A considerable portion of the energy load is developed by hundreds of electric-driven irrigation pumps. Extreme drouth in the region has resulted in heavy demands for pumping and power purposes.

Public Service Co. operates an interconnected electric system between the San Luis Valley and Salida areas. A 44,000-volt transmission line from the Alamosa plant ties in to a line over Poncha Pass connecting with the Salida system.

● PREFABRICATION of 4-ton concrete slabs to repair Barker Dam, near Nederlands, Colo., is in process. The sections, to resurface the upstream face of the old structure, are being made under a new concrete-mixture formula perfected by the U. S. Bureau of Reclamation; will be installed during the winter of 1946-47 after the lake is drained about Oct. 1. When full, the dam impounds 11,500 acre-ft., of water, used to operate Public Service of Colorado's Boulder Canyon hydroelectric plant located five miles west of Boulder.

● MOHAVE ELECTRIC Cooperative, Kingman, Ariz. has filed articles of incorporation and is expected to receive REA assistance in building lines into Bullhead City at the site of the Davis Dam project. Bullhead City residents at one time asked the Arizona Corporation Commission to order the Citizens Utility Co. of Kingman to extend its lines to the construction town, but the petition was withdrawn.


The rounded nose permits working in confined spaces—no sharp edges to nick wires
Matched jaws—serrated inside—for sure grip
Sharp knives are matched and honed to assure clean cutting
Hinge—perfect fit—jaws do not get out of alignment
Perfect balance with weight properly distributed makes Klein's easier to use
"Hand fit" handle
Spring tempering in the handle, prevents tiring hands
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Ask a lineman—electrician—or a skilled craftsman in any field why he prefers Klein pliers. He may mention the balance of Kleins that makes them feel comfortable—the sharp knives that stay keen even after years of service—the jaws that grip tight or the spring in the handles that prevents tired hands.

All of these qualities are evidences of the careful design—the years of experience—the hand-craftsmanship methods by which Klein pliers are made.

But even more they typify the careful control of every step in the manufacture—from the specification of the high grade tool steel made to our analysis to the individual inspection every pair of Kleins receives before it is boxed ready for shipment.

Everything possible is being done to satisfy your requirements for these quality pliers, but demand still exceeds supply. Keep Kleins on order—your supplier will fill your order as soon as possible.

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IDAHO FALLS TO INSTALL NEW GENERATING UNIT

A new $110,000 generating unit being installed at the Idaho Falls lower plant on the Snake River will be placed in service by September, according to M. P. Goudy, city electrical superintendent.

The new generator will supply the community with an additional 1,500 kw. of electric energy, increasing the total capacity of Idaho Falls power to 8,500 kw. Goudy said the new unit would partially alleviate the present power shortage but would not be sufficient to meet growing demands of the city in the future.

At present Idaho Falls is purchasing "up to 1,000 kw. of power from the Utah Power & Light Co.," Goudy said.

Co-op Proposes to Build Own Generating Plant

Plans to build an REA power generating plant to supply four existing and proposed cooperatives at Burlington, Yuma, La Junta and Limon, Colo., were announced by O. E. Gregory, Center, Colo., president of the Colorado Rural Electric Assn. The plant would be located between Limon and La Junta and cost $750,000. Engineers are now engaged in preliminary work.

REA, furthermore, has arranged to purchase, at an unnamed price, the municipally owned power plant at Meeker, Colo., which is to be converted from hydro to natural gas, to supply energy for the Rangeley oil area, according to W. H. Robinson, attorney for the state REA.

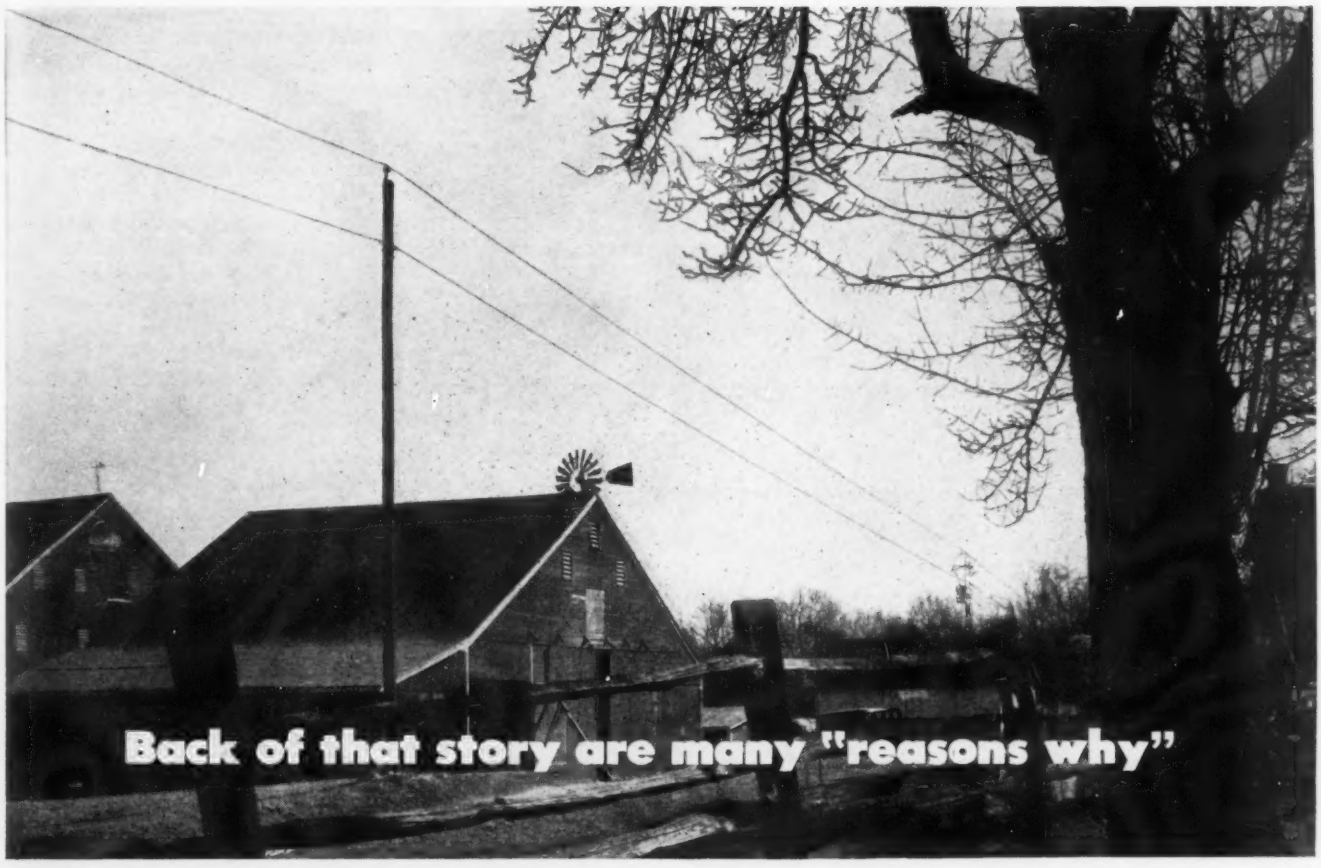
These developments indicate a new phase of REA operation, since most co-ops now purchase power from private utilities. Gregory said that Colorado REA projects expect to build more than 10,000 miles of lines before the end of 1947, serving 6,500 additional farms, the over-all program to involve $9,000,000.

Seattle Asks Funds for Fish Rearing Ponds

Officially recognizing that Seattle City Light's Skagit dams are in some degree responsible for destruction of fish life in the river, Superintendent E. R. Hoffman has asked city council approval of a remedial plan. Under a contract with the state of Washington, City Light would agree to finance construction of seven rearing ponds and related water system to be built by the state game department at the Skagit River hatcheries. Hoffman estimated the cost of the project at $54,950.

THEY USED TO SAY "What is Ruralductor?"

NOW THEY SAY "Get me Ruralductor!"



One of the reasons is that Ruralductor is *strong*. Being of steel, this stranded conductor, made by Bethlehem for rural areas, possesses the strength that makes possible longer spans. It thus reduces the number of costly pole structures.

Another reason is that its carrying capacity, while less than that of non-ferrous conductors, is entirely adequate for most of the sparsely-settled areas not yet electrified; in other words, where secondary feeders and tap mileage will predominate.

Hence, when used as recommended, Ruralductor accounts for twofold savings: (1) in the number of structures, and (2) in the line material itself—for Ruralductor is less expensive than non-ferrous conductors.

We'd like to tell you about the many miles of Ruralductor installations—jobs that have proved its economy right from the start. Bethlehem Pacific engineers will gladly furnish full, detailed information.

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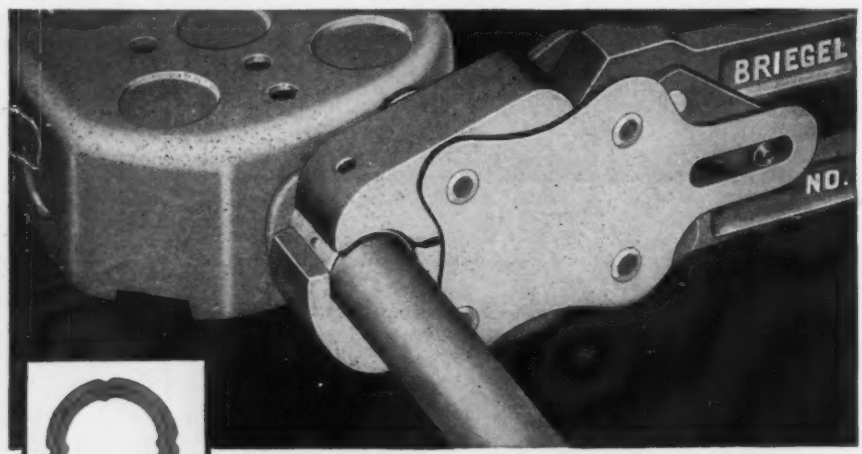

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BOND ISSUE AUTHORIZED BY SACRAMENTO DIRECTORS

General obligation bonds totaling $10,500,000 were authorized for sale July 11 by the directors of Sacramento (Calif.) Municipal Utility District for funds to acquire and operate electrical properties which the district is to take over from Pacific Gas and Electric Co. on Jan. 1.

According to James E. McCaffrey, general manager, the district will be able to raise $15,600,000 on sale of the bonds, with interest payments not to exceed a maximum of 5%. About $600,000 in bonds would be retained for a reserve fund.

Contained in the agreement between PG and E and the district will be provision for sale of wholesale power to the latter until June 30, 1954. Estimated district demand has been set at 27,000,000 kwh. monthly, with an accompanying rate reduction of one-half mill per kwh.

● REPRESENTATIVES of rural electric cooperatives from western Montana, northern Idaho and eastern Washington held a four-day conference with district REA officials recently in Missoula, Mont. The general meeting was under the direction of R. O. Adams of the REA management division. Highlight was a school for bookkeepers and accountants, headed by James H. O'Brien, chief of the district REA finance division.

● SIERRA PACIFIC POWER CO. and the Almone Electric Cooperative Inc. recently signed an agreement under which Sierra Pacific will serve areas in California's Alpine and Mono counties and the co-op waives all rights to serve those regions. The company agreed to begin preliminary survey work immediately, and promised to construct power lines as soon as materials are available.

● UTAH POWER & LIGHT CO. will continue to supply power to West Jordan, Woods Cross, Centerville, and Murray, Utah, under certificates of convenience and necessity recently granted by the state utility commission. The communities have heretofore been unincorporated areas. The commission also granted the utility approval on an interchange power agreement with Murray City, Nev.

● PRELUDE to Public Service Co. of Colorado's application for a new franchise at Sterling in May 1947 was an election in which a proposal for construction of a municipal power plant was defeated by a margin of 1,179 to 568.

KAISER INTERESTS SIGN BONNEVILLE CONTRACT

A contract for 40,000 kw. has been signed by the Henry J. Kaiser aluminum interests and the Bonneville Power Administration. Under its terms Columbia River power will be delivered to the Trentwood rolling mill near Spokane, operated by Kaiser's Permanente Metal Corp.

Power for the potlines in operation at the near-by Mead reduction plant is being furnished at present under an interim agreement, pending approval by FPC of revised Bonneville wholesale rates. When negotiations are completed, it is expected that a ten-year contract will furnish 250,000 kw., the amount needed when both plants reach capacity operations. Kaiser officials predict all six potlines at Mead will be working by the end of the year.

Another outlet for Bonneville power was assured recently when Reynolds Metal took over the aluminum reduction plant at Troutdale, Ore., under a lease agreement with WAA. Reynolds it is said, is spending about $1,000,000 to get the war plant into production and must contract for the 100,000 kw. necessary when peak output is reached.

Western Power Companies Win Advertising Awards

Three Western power companies received national awards in the 1946 Better Copy Contest of the Public Utilities Advertising Assn. They were Colorado Central Power Co. in class 9 (special booklets, pamphlets and circulars); Montana Power Co., class 12 (outdoor advertising); Puget Sound Power & Light Co., class 13 (annual stockholders report.) The Puget Power award marked the third consecutive year that the company's annual report has received national prominence, the 1943 and '44 reports taking first place in the Reddy Kilowatt contest and the 1944 report in the *Financial World* competition.

Honorable mention was received by B. C. Electric, Northwestern Electric, Pacific Gas and Electric (4 classifications), Puget Sound & Light, Southern California Edison (3 classifications), Washington Water Power and the three top award winners.

● ACCORDING to statement from Ottawa, approximately $300,000 will be spent this year in British Columbia in investigation of the resources of the Columbia River. The investigation is being conducted by the international joint commission, which will report its findings to the Canadian and U. S. governments.

Added Protection for Tirex

TIREX SELENIUM Neoprene Armor

MEANS Added Savings FOR YOU!

To the economy-wise cable buyer, the new Selenium Neoprene Armor on all TIREX electrical Cords and Cables means greater savings resulting from longer service life and more dependable performance than ever before.

This new TIREX jacket provides unexcelled protection from sunlight and heat, thus preventing cracks or light-checks, and its resistance to oils, greases, acids, and moisture eliminates costly deterioration. Selenium Neoprene Armor also features increased safety value as it is flame-resistant, and is unsurpassed in its capacity to withstand the wear and tear of harmful abrasives.

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Supply needed pressure for easy flow of current!

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- Save power.
- Reduce fire and accident hazards.

TRICO "Powder-Packed" RENEWABLE FUSE

This "different" fuse gives maximum protection and THREE TIMES the SERVICE at no added cost. Custom-built renewal element, "powder-packed" feature, and rugged construction make possible the following advantages . . .

- Tamperproof protection.
- Non-interchangeable link.
- Safe time-lag.
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- Guaranteed results.

TRY *this* Combination Today!

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PEOPLE

made this news

● L. HAROLD ANDERSON was appointed vice-president of Pacific Gas and Electric Co., effective Aug. 1. Anderson, who recently resigned from the California Railroad Commission, was for a number of years a director of Palo Alto's electric, gas and water properties and from 1940 until 1945 was city engineer. According to President J. B. Black, his duties with PG and E will be of a general nature and will include special assignments pertaining to construction and operation

Anderson

of company properties and to customer relations. He will report to A. E. Wishon, vice-president and general manager.

● CLARENCE A. MOON, salesman for the Graybar Electric Co. in the Spokane territory for more than 22 years, recently was transferred to Tacoma. Moon joined Graybar forces in 1923, having previously worked for the North Coast Electric Co. for two years.

● RALPH O'BRIEN has been named manager of Central Arizona Light & Power Co.'s new district office in Sunnyslope. His appointment followed ten years of service with the company in line construction, maintenance and general utility operation.

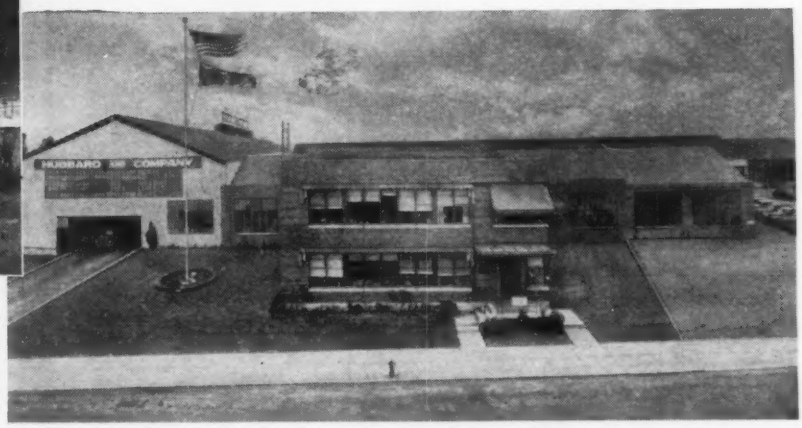
● R. H. SHEWAN and JAMES A. MCCARTHY have joined the agriculture department of the B. C. Electric Railway Co. Ltd. Both served with the RCAF during the war, and hold university degrees in animal husbandry.

EXPANDED PRODUCTION CAPACITY

means more . . .

HUBBARD HARDWARE and PEIRCE SPECIALTIES

Drop forging facilities have been greatly increased



Hubbard and Company Plant, Oakland, California

All ten Offices and Warehouses of the GENERAL ELECTRIC SUPPLY CORPORATION, on the Pacific Coast, carry substantial stocks of HUBBARD Pole Line Hardware and PEIRCE SPECIALTIES.

A few of the large battery of punch and trimming presses

The increased capacity of the Hubbard and Company plant at Oakland, California, will mean faster and better service in the delivery of Pole Line Hardware and Peirce Specialties

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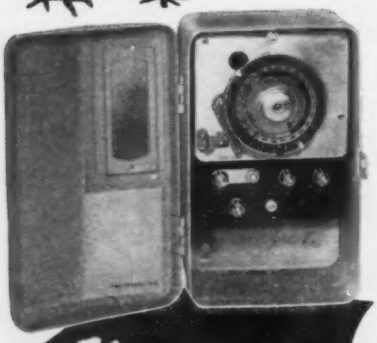

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POULTRY
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NEW LOW PRICE
$12.75 LIST . . .
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A low price switch with evening dimming feature. Authorities have proven that both morning and evening lighting greatly increases egg production per pound of feed.

Season Starts September 1st

Large quantities of the new PS-30 and basic materials for additional quantities are now in Paragon stocks. Recent enlargements in plant . . . modernized manufacturing methods . . . availability of raw materials . . . make savings in manufacturing costs reflected in the new low price. Order your poultry switches early.

Paragon designs and manufactures time controls for every need.

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Paragon Two Rivers WISCONSIN
BUILDERS OF ELECTRICAL EQUIPMENT SINCE 1905

● FRANK V. WRIGHT, general superintendent of California Electric Power Co., retired at the end of June after 28 years of service with the company and has been succeeded by WILLIS T. JOHNSON, his assistant for the past four years. Wright went to California Electric in 1918 from Western Colorado Power Co., Telluride, Colo. In December of that year he was made superintendent at Randsburg, a year later went to Tonapah as engineer and in 1920 became traveling superintendent with headquarters at Riverside. He was appointed assistant general superintendent in 1923 and general superintendent in 1942. Johnson began with the company in 1925 and has served as general superintendent at Yuma, Ariz., and district superintendent of operations in the Imperial Valley, California.

● EARL GERMAINE has been appointed advertising and sales promotion manager for the L. J. Meyberg Co., Los Angeles. Germaine was formerly connected with the publicity department of the Business Agents' Division, Los Angeles Department of Water & Power, and went into the Army at the outbreak of the war. He rose to the rank of major from a start as buck private.

● H. L. DAVIN, formerly of Philadelphia, has been appointed regional representative of the Bussmann Mfg. Co., with headquarters in Denver, succeeding JACK SHOLINE, who resigned to accept a position with another firm. Davin was associated with the Bussmann firm five years before entering military service.

● NORTHWESTERN ELECTRIC CO. has appointed E. F. PEARSON as assistant general manager in charge of its Washington division. For several years Pearson has been assistant to T. E. ROACH, vice-president and general manager, and in that position has supervised activities in the division.

● JOHN F. GOGINS, general manager of General Electric Co.'s Spokane office, has been promoted to assistant district sales manager for the entire Pacific Northwest and Alaska. His headquarters will be in Portland.

● CLINTON HURD, sales engineer for Allis-Chalmers Mfg. Co. in Seattle, resigned recently to become manager of Cowlitz County (Wash.) PUD. His headquarters will be in Longview.

● RICHARD E. ANDERSON has been appointed office manager for G-E Supply in Spokane. During the war he was overseas with the Army Engineers.

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Resinite insulating tapes and tubing in stock sizes.

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● FOLLOWING his resignation as superintendent of Tacoma City Light, ALVIN F. DARLAND will return to the USBR staff at Grand Coulee Dam. He will direct all bureau construction, operation and maintenance activities for the dam and for the equalizing reservoir and the South Dam, near Coulee City. Darland was construction engineer when Grand Coulee Dam was being built and ended eleven years of service with the bureau when he became Tacoma City Light superintendent in May 1945. A native of Tacoma, he had served the municipal utility previously in various capacities, and for four years had been electrical superintendent for the Todd Dry Dock and Construction Corp. in Tacoma.

Darland

● ROBERT R. WILLARD has been appointed general counsel for the Bonneville Power Administration, succeeding C. GIRARD DAVIDSON, who recently became assistant interior secretary. Willard has been assistant general counsel for Bonneville since 1941.

● O. G. HITTLE has been made acting manager of the Bonneville Lower Columbia district office. He will continue his work as district engineer pending a new appointment. Hittle returned to the Bonneville staff recently after serving 20 months in the Navy.

● SAMUEL B. ROSS, economic adviser for the Department of Justice, antitrust division, has been loaned to Bonneville Power Administration. He will assist Ivan Bloch in preparation of a forecast of industrial power requirements in the Columbia basin area.

● J. V. LAMSON has replaced VICTOR MUZSNAY as Bonneville's Puget Sound district engineer. Muzsnay has been transferred to the Portland engineering division.

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IN THESE PAGES NEXT MONTH

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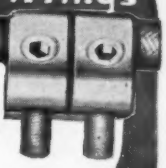

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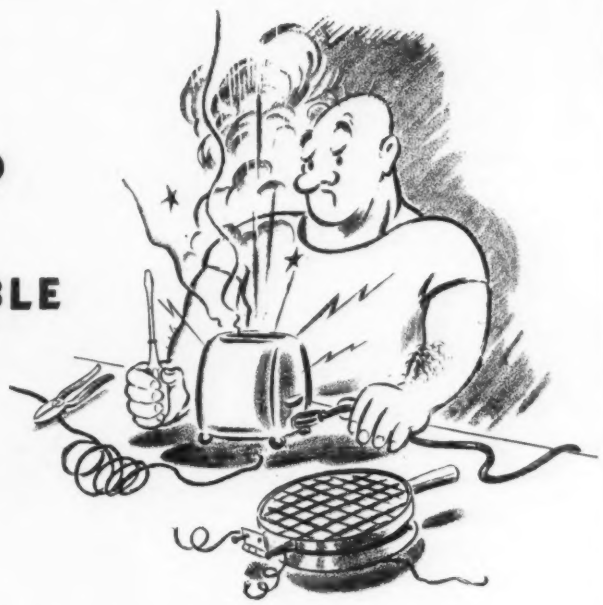

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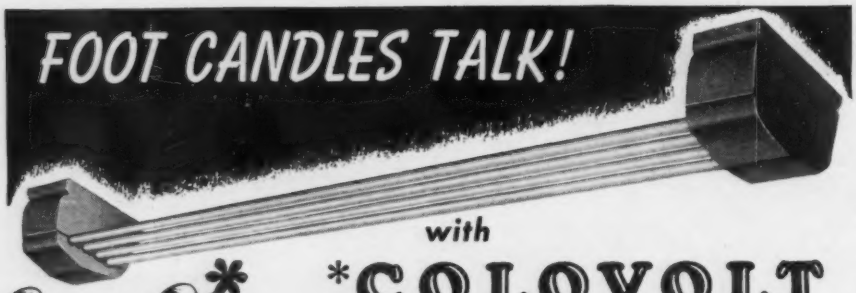

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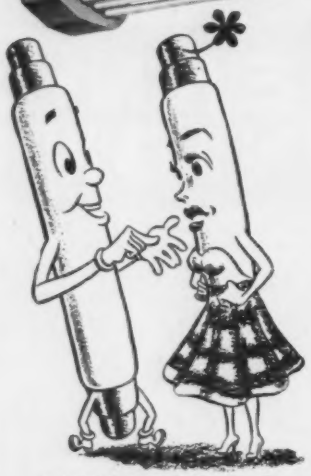
Cold Cathode—Low Voltage Lighting



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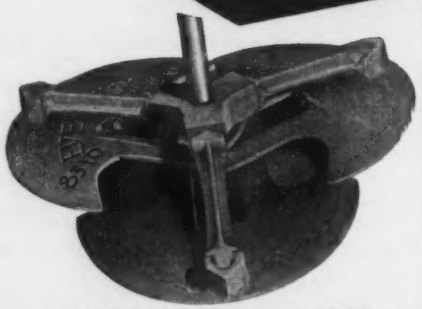

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FAIRFIELD, IOWA

● APPOINTMENT of PAUL E. SHAAD as chief electrical engineer for the Sacramento Municipal Utility District was announced by James E. McCaffrey, general manager. He will be responsible for the system to be acquired from Pacific Gas and Electric Co. on Dec. 31. Shaad was with Hawaiian Electric Co. for more than four years and previously took the General Electric company's training course in field engineering.

● AS ADMINISTRATIVE officer of the Sacramento Municipal Utility District, CARL L. RICHEY is aiding in organization of a staff to operate electric properties when the district takes over the system.

● R. L. DUNSHEO, for 20 years with Pacific Gas and Electric Co., will be commercial manager of the Sacramento Utility District.

● M. W. PHILLIPS, for 17 years Southern California Edison district manager in the San Joaquin Valley, retired on June 1. He was vice-president and general manager of the Ojai Power Co. when it was merged with Edison in 1928.

● SUCCEEDING M. W. PHILLIPS as Edison's San Joaquin Valley district manager is ARTHUR T. LAWSON, former assistant division manager and acting district manager at Visalia. L. R. QUINBY has been moved from Porterville to Visalia as district manager.

● CLAIRE HELWEGE, architectural and kitchen designer, has just joined the Southern California Edison Co. residential sales department as a kitchen designer, according to Henry C. Rice, manager of the department.

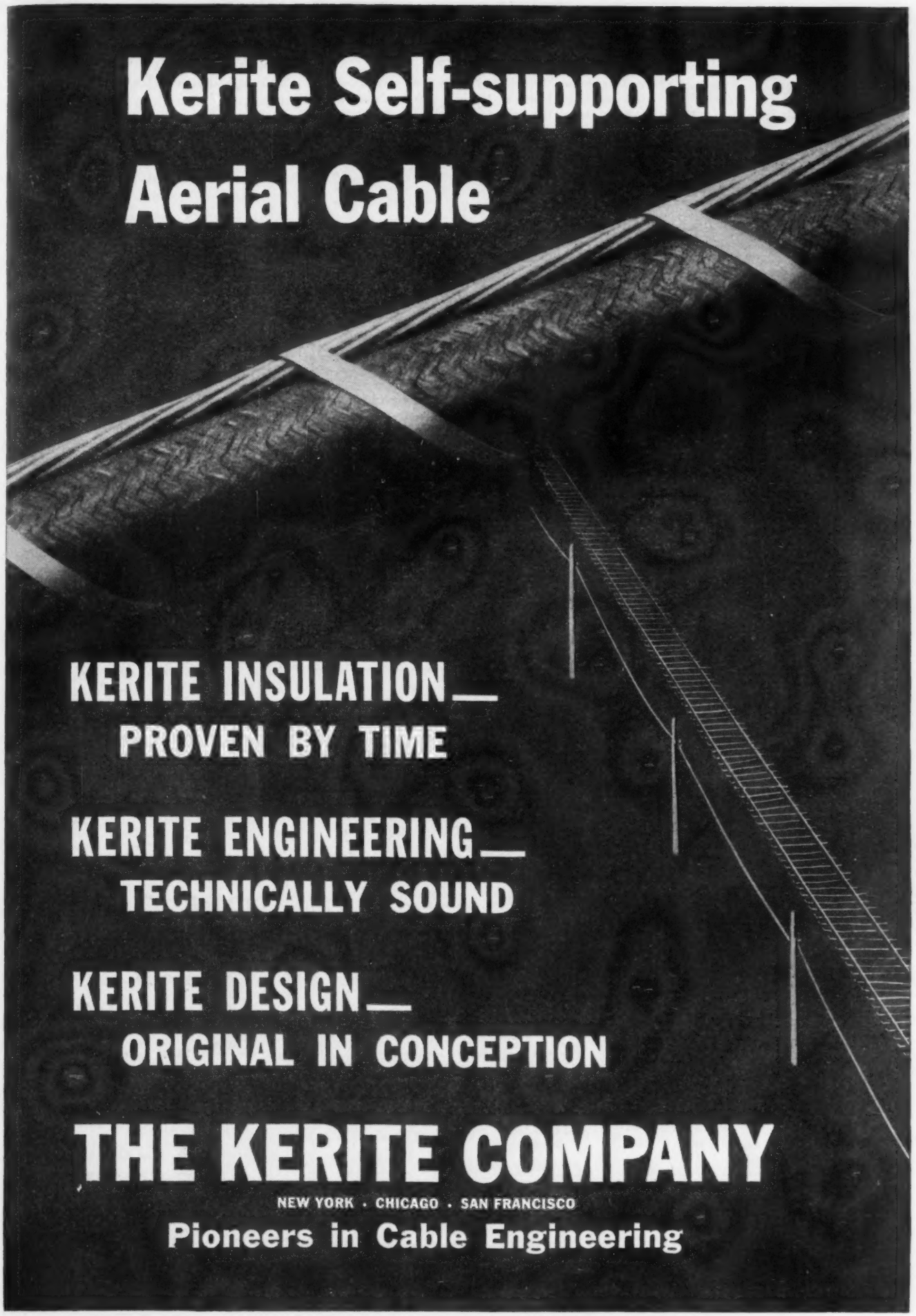
● FRANK FOLSOM, executive vice-president of the RCA-Victor Division, and J. M. MURRAY, vice-president in charge of the record division of RCA-Victor, are due to visit the West Coast during the month of August.

● J. E. LOISEAU, president of Public Service Co. of Colorado, has been elected a member of the board of directors of the Edison Electric Institute.

● HARRY A. JOHNSON, colonel in the Coast Artillery corps during the war, has rejoined Westinghouse as Micarta and insulation specialist at San Francisco.

● WILKS F. LAMBIRTH is now California Electric Power Co. district manager in Inyo and Mono counties.

Kerite Self-supporting Aerial Cable



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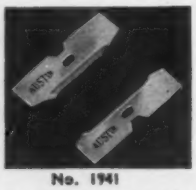
Pacific Coast Representatives: Carlo Baldassari, 582 Market St., San Francisco 4.
Robert A. Young & Co., 714 Olympic Blvd., Los Angeles 15.

AUSTIN LEVELING BRIDGE FOR SWITCHES AND RECEPTACLES



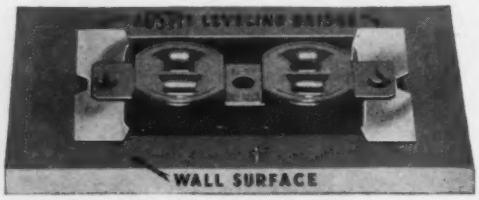
No. 1941

Here is a very inexpensive device that saves time and eliminates all the troublesome problems of leveling switches and receptacles with the surface of the finished wall so that the plates fit perfectly.

It positively eliminates broken or distorted plates and loose switches or receptacles. It is very common to go back to the job to mount the switch or receptacle plates only to find that the box is setting a bit crooked or it is too far back from the wall so that the receptacles do not line up with the plates. The Austin Leveling Bridge completely overcomes this problem.

It rests on the surface of the finished wall and the screws for the switch and receptacle pass through it and into the ears of the switch box. Therefore the receptacle is in perfect alignment for the plate. Ideal for concrete jobs where the boxes seldom come flush.

No matter how far back or how crooked the box may be the Austin Leveling Bridge makes every switch or receptacle fit perfectly with the plate and every plate fit perfectly on the wall. Made for single or two-gang outlets.



Above illustration shows a duplex receptacle mounted on the Austin Leveling Bridge. Note:—Receptacle is flush with wall surface and in perfect alignment for the plate.

ORDER FROM YOUR ELECTRICAL WHOLESALER

Austin Cat. No.	Type	Wt. Lbs. Per 100 Sets	Carton	Standard Package	NET PRICE PER 100 SETS Less Than 100 Sets	100 to 499 Sets	500 Sets and Over
1941	Single Gang Bridge .	3	100 sets	500 sets	$2.05	$1.75	$1.55
1942	Two Gang Bridge	5	100 sets	500 sets	4.10	3.70	3.35

THE M. B. AUSTIN COMPANY

108-116 SO. DESPLAINES ST., CHICAGO 6, ILL.
PACIFIC COAST REPRESENTATIVES
HAUCK AND BISHOP, Chronicle Building, San Francisco 3, Calif.
J. G. POMEROY CO., 1004 East 4th St., Los Angeles 13, Calif.
W. W. WHEAT & SON, 560 1st Ave., South, Seattle 4, Wash.

ALL the strength and durability inherent in steel are combined---with definite economies---in *Crapo* Galvanized Steel Strand. Heavy, ductile, tightly-bonded zinc coatings, applied by the famous *Crapo* Galvanizing Process, provide lasting protection against corrosion.

Ask the distributor of *Crapo* Galvanized Products near you or write direct for further information!

INDIANA STEEL & WIRE CO.
MUNCIE, INDIANA

H. H. Van Luven

307 East 3rd St. Los Angeles (13)
MUtual 5173

Manufacturers' Representative

CONNECTICUT TELEPHONE & ELECTRIC DIVISION
GREAT AMERICAN INDUSTRIES, Inc.
Intercommunication Systems
Apartment House Telephone Systems
Automatic Telephone Systems
Hospital Signal Systems
Annunciators, Connectapower Units

LENZ ELECTRIC MFG. CO.
Lead—Braid Covered Cables and Wires
Tinsel and Copper Cordage
Special Cables

SIGNAL ENGINEERING & MFG. CO.
Relays—Bells—Horns—Code Call Systems
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HART MANUFACTURING COMPANY
Remote Control Equipment
Relays—Thermostats

STERLING SIREN CO.
Electric Sirens

OPERADIO MANUFACTURING CO.
Flexifone Intercommunication Equipment

TRICO FUSE MFG. CO.
Fuses, Oilers, Clip Locks and Fuse Pullers

KNOX PORCELAIN CORP.
Electrical Porcelain

● MICHAEL B. SULLIVAN, for many years with the Washington Water Power Co. as roadmaster and later superintendent of equipment for the Spokane United Railways, has been appointed superintendent of public works for the city of Spokane.

● WILLARD JOHNSON will serve as chief of system development for the Arizona Power Authority. He had been serving under the new director, Kenneth Aldrich, in Bonneville's transmission development unit.

Deaths

● ROY BREED, 43, electrical engineer, died in Seattle late in June, following an illness of several months. During the past 20 years he had been employed by Puget Sound Power & Light Co., the National Steel Construction Co. and Winslow Marine Railway & Shipbuilding Co.

● JOHN B. FISKEN, retired consulting engineer and pioneer of the electric industry in the Northwest, died in Spokane in May. He was associated for many years with Washington Water Power Co. and its predecessor.

● JOHN S. CRAVENS, first president of the Edison Electric Co. of Los Angeles, died recently. He was associated with Edison from the late 1890's to 1907, was president from 1899 to 1901.

● ALBERT GALVIN, who with his brother, James Galvin, owned the electrical contracting firm of Galvin Bros., in San Francisco, died after a long illness, July 19.

TORK CLOCKS

THE POPULAR TIME SWITCH LINE KNOWN EVERYWHERE

There is a Tork Clock for every regular switching job: 60 minute, 4 hour or daily cycles.

Bulletins on request

THE TORK CLOCK CO., Inc.
MOUNT VERNON, N. Y.

Western Representatives
L. H. Veale, 445 E. 3rd St.....Los Angeles
Geo. H. Curtiss, 540 McAllister St.....S .F.
H. M. Sayers, 1101 Eastlake Ave.....Seattle
Stevens Sales Co., 41 P.O. Place, Salt Lake
Felix Simon, P.O. Box 614.....Denver
H. Geo. Shefler, P.O. Box 1507.....Phoenix

TRADE notes

Fowler Adopts Employee Participation Plan

Fowler Mfg. Co. of Portland has inaugurated an employee participation plan for the benefit of all plant workers, according to Paul L. Fowler, president and founder of the company.

The plan is simple in operation. For each new water heater leaving the assembly line, 50 cents is put into the fund by the company; for each porcelain range boiler, 15 cents. One per cent of the gross billing of porcelain and painting job work done by the company is added to the above.

In order to promote a high degree of individual workmanship, a deduction system has been made a part of the plan. Any heaters made after April 1, 1946, and replaced without charge, will cost the fund one dollar per heater. Range boilers falling into the same category would cost 30 cents. In no case will any deduction be made from a Fowler employee's wages. The participation fund operates solely as an "above wage" earning.

At the end of the year, the remaining fund is to be distributed to plant employees on a percentage basis.

● S. R. MATHISON has been appointed West Coast manager for Youngstown Kitchens division of Mullins Mfg. Corp. His headquarters are in Redwood City, Calif. Distributors for the kitchens in the West are Gough Industries, Los Angeles; Devlin-Drew Co., Fresno, Calif.; Pioneer Appliance Co., San Francisco; Saviers Electrical Products Corp., Reno.

● A NEW ELECTRICAL CONTRACTING firm, Northwest Electric Co., has been formed by Louis Benedetti and John Sroufe, with headquarters at 201 Bayview Bldg., Seattle. Benedetti was former part owner of Industrial Electric Co., and Sroufe was with Morgan Electric Co., Seattle.

● WARREN STUART, recently discharged from military service, will represent Melden Mfg. Co., makers of wire and cable, in California. HAROLD HOFMAN, former Kansas City representative of the company, has been transferred to the Pacific Coast.

● COMMERCIAL APPLIANCE Co., Seattle distributor for Crosley Corp., has moved to 1534 First Ave., S.

Keep their minds on their work-

BUCKINGHAM EASY BELT No. 58: Floating feature. No metal contacts body. Made of finest harness leather and lined with soft chrome lace leather.

BUCKINGHAM STANDARD SAFETY STRAP NO. 42A: Drop-forged, tested snaps and buckles, reinforced with metal to increase strength and wear. Made from backs of best selected harness leather.

BUCKINGHAM SPUR PROTECTORS: Keep spurs sharp and give climbers longer life.

with BUCKINGHAM *Safety* Equipment

STEPHENS CLIMBERS: Originator and sole manufacturer of this famous climber, Buckingham rigorously maintains the quality and safety standards that have made them famous for 45 years.

Physical discomfort and fatigue . . . nervous strain and constant hazard . . . all tend to distract the lineman and lower his efficiency. Buckingham safety equipment helps to keep his mind on his work. It has won his confidence by 45 years of reliable performance. It's proved scientific design reduces discomfort and saves his energy. That's why it is a favorite with the U. S. Army Signal Corps, with 28 great utility companies, and with many telephone companies, railroads and fire departments all over the United States.

Write for Catalogue 24 showing the complete Buckingham line.

Buckingham distributors in many principal cities

Buckingham MANUFACTURING CO., INC.

Walter E. Crow, President 5-7 Travis Street, Binghamton, N. Y.

DEPEND ON—INSIST ON—
P.R. MALLORY & CO., Inc.
MALLORY
CAPACITORS

Necessary leads, lugs, screws, and nuts are included in each box for any type connectors.

Mallory MSG Capacitor:—Small, compact AC Motor Starting Capacitor that fits almost every mounting bracket or box. Replaces rectangular capacitors with leads, lugs or studs. Each capacitor is packed with complete set of universal mounting hardware and installation instructions.

Distributed by
INSULATION AND WIRES INCORPORATED
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BOSTON 20, MASS. DETROIT 2, MICH. ATLANTA 3, GA.
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SITTLER COMPANY
CHICAGO 7, ILL.
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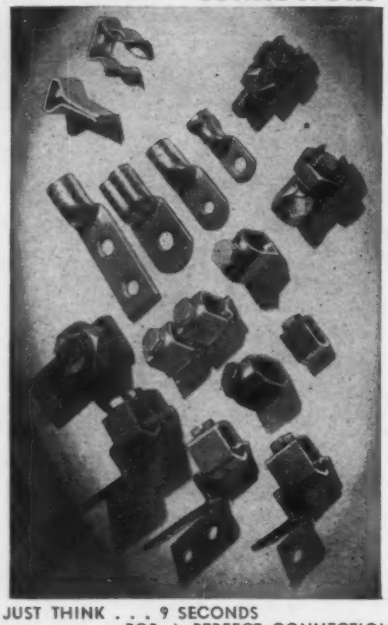
TRI-STATE SUPPLY CORPORATION
LOS ANGELES 13, CAL. • SAN FRANCISCO 7, CAL. • SEATTLE 4, WASH.

ILSCO ELECTRICAL CONNECTORS



JUST THINK . . . 9 SECONDS
FOR A PERFECT CONNECTION
Many millions in actual use . . . because no guesswork . . . no worries . . . no special tools. Economical . . . dependable . . . connecters can be used over and over. ILSCO CONNECTORS are Underwriters' Approved, 99% pure electrolytic copper, 100% conductive.
Western Distributors Electrical Specialty Co., Seattle. San Francisco; Strieby & Barton, Ltd., Los Angeles
ILSCO COPPER TUBE & PRODUCTS, Inc.
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BRUSH KITS OF ALL DESCRIPTIONS
CARBON BRUSHES OF ALL DESCRIPTIONS
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Portland, Oregon Beacon 3368
611-613 W. Pico Blvd.
Los Angeles 13, Calif. Prospect 2523
1644 Blake Street
Denver 2, Colorado Cherry 4425
524 F Street
Salt Lake City 3, Utah Telephone: 3-1600

● HENRY M. BUTCHER, formerly sales manager for Ace Electric & Supply Co., San Francisco, and who served in the Navy during the war and prior to that with an electrical and hardware concern for 25 years, has established a business of his own as sales agent. He represents Elkins-Ewall Co. of Philadelphia, makers of vacuum cleaner belts, in California; Sav-U-Time, electric hot water controls made in Rochester, N. Y., for California territory; Herman H. Sticht Co. of New York City, a line of megohmers, northern California territory; Heet-It appliances of Ambidex Inc., New York City, for northern California; Fordham Mfg. Co., New York, pocket neon testers for the states of Nevada, Oregon and Washington; Industrial Devices Inc., Edgewater, N. Y., HandiGlow night light and pilot light, for the state of Nevada. He has a field organization to cover the four states.

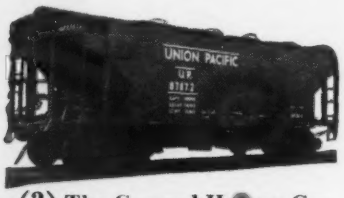
● ALLIS CHALMERS Mfg. Co. has announced that the Miller-Robinson Co., 7607 Avalon Bldg., Los Angeles, will act as its service engineers on the Pacific coast for high-frequency induction and dielectric heating equipment. Miller-Robinson are West Coast pioneers in such applications and maintain a complete high-frequency engineering and tooling service. They will conduct continuous induction heating demonstrations in their modern high-frequency laboratory each Wednesday afternoon, the announcement said.

● A-1 RADIO SALES and Service Inc., N 624 Monroe St., Spokane, has been purchased from Fred Burk by Dunbar B. Triplett Jr. and Robert D. Glendinning. Triplett served overseas as a 12th air force B-25 pilot in the Mediterranean and Glendenning was communications officer aboard a supply ship during the New Guinea campaign in the Pacific.

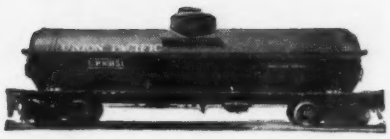
● ASSOCIATED RADIO DISTRIBUTORS have established new headquarters in a two-story building, 1251 Folsom St., San Francisco, according to Cecil Roarke, manager. The organization is a wholesale radio and electronic distributing firm covering the northern California territory.

● F. L. JACOBS Co., appliance division, has appointed Ray Swanson as Western representative for the Launderall, with headquarters at San Francisco. Recently discharged after four years in the Army, Swanson was with Douglas Aircraft before the war.

● UNITED STATES RUBBER Co. has established a Northwest division with headquarters at Portland. CHESTER W. ORT is divisional manager.

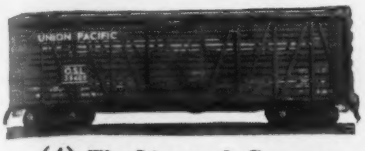


(3) The Covered Hopper Car

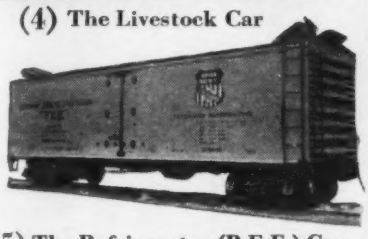


(2) The Tank Car

(1) The Hopper Car



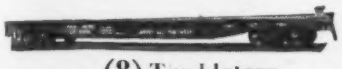
(4) The Livestock Car



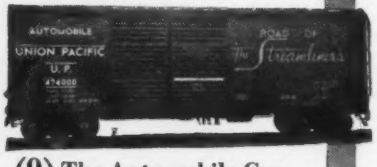
(5) The Refrigerator (P.F.E.) Car

(6) The Box Car

(7) The Gondola



(8) The Flatcar



(9) The Automobile Car

Transportation Tailored to *your* INDUSTRY

To most effectively meet the needs of American Industry, Union Pacific provides a fleet of freight cars specifically designed to transport all types of materials and merchandise.

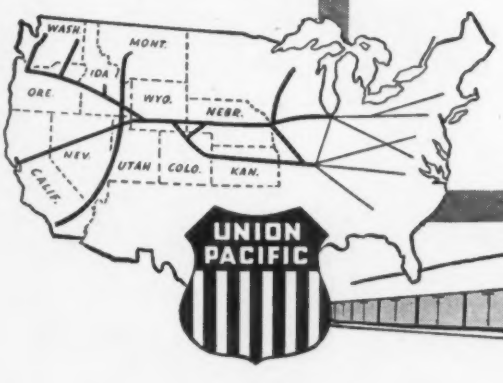
Sturdily constructed and efficient in mechanical operation are the various types of freight cars pictured on this page. This safe, dependable rolling stock is a vital factor in providing transportation for the commerce of the nation.

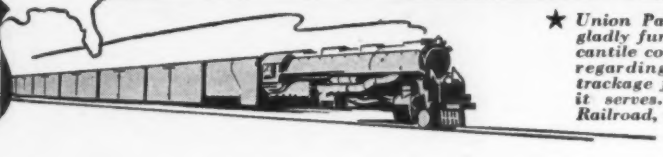
Of special interest to the Electrical Industry is the box car, Fig. 6, used for the shipment of finished electrical merchandise.

The trained knowledge and experienced skill of thousands of Union Pacific employees keep shipments rolling on schedule over the time-saving Strategic Middle Route, uniting the East with the West Coast. Experienced traffic specialists, from coast-to-coast, are ready to assist you. Let them help you with your *next* shipment.

For fast, dependable service . . .

be Specific – say "Union Pacific"





★ *Union Pacific will, upon request, gladly furnish industrial or mercantile concerns with information regarding available sites having trackage facilities in the territory it serves. Address Union Pacific Railroad, Omaha 2, Nebraska.*

UNION PACIFIC RAILROAD

The Strategic Middle Route

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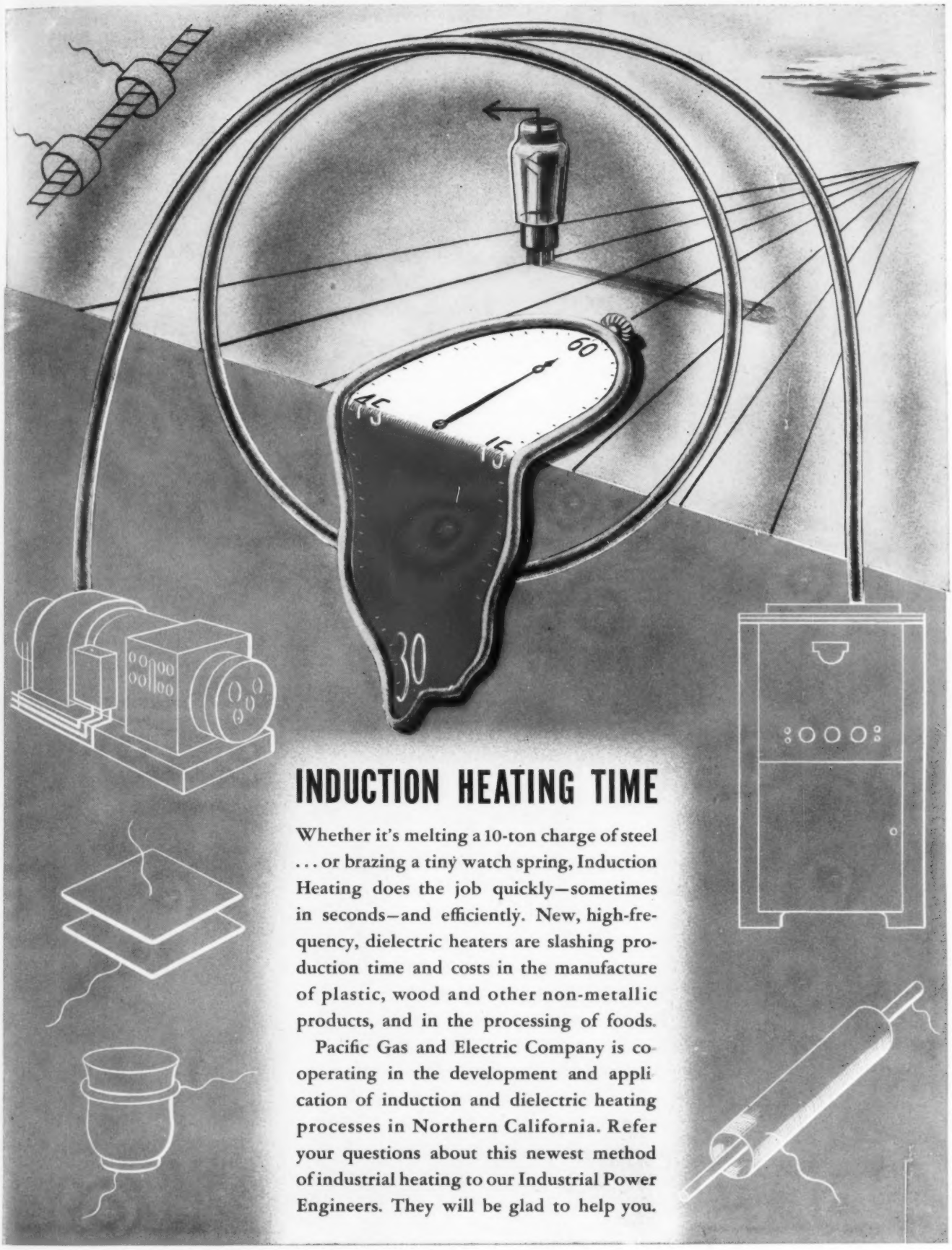
PROFILES *of the month*

New officers of Electrical Maintenance Engineers of No. Calif. (right) are: Phil Stolz, Alameda Air Base; R. S. Carroll, Stone-Ryals Electric Co.; Tone R. Gray, Healds Engineering School

Promotions brought changes in Sylvania's West Coast organization (below). Ted Burdick, left, moved from San Francisco, where he was associated with George Sommers, Western regional manager, center, to take the Los Angeles district managership, left open when G. W. "Chick" Field, right, was transferred to Cleveland, Ohio. Replacing Burdick in San Francisco will be Carl S. Long, Jr., (not shown) recently returned from the armed services, formerly with Sylvania Electrical Products, Inc. at its Kansas City office. Long is already on the job

George C. Tenney, editor of Electrical West, last month called on members of the industry in Honolulu, where he addressed a distributors meeting sponsored by Hawaiian Electric Co. Below (right) he visits with utility men (from left) P. H. Anderson, vice-president in charge of non-utility operations; R. B. Johnson, vice-president and secretary; G. S. Jacobs, first vice-president and treasurer; L. A. Buese, vice-president and executive engineer, all of Hawaiian Electric Co.



INDUCTION HEATING TIME

Whether it's melting a 10-ton charge of steel . . . or brazing a tiny watch spring, Induction Heating does the job quickly—sometimes in seconds—and efficiently. New, high-frequency, dielectric heaters are slashing production time and costs in the manufacture of plastic, wood and other non-metallic products, and in the processing of foods.

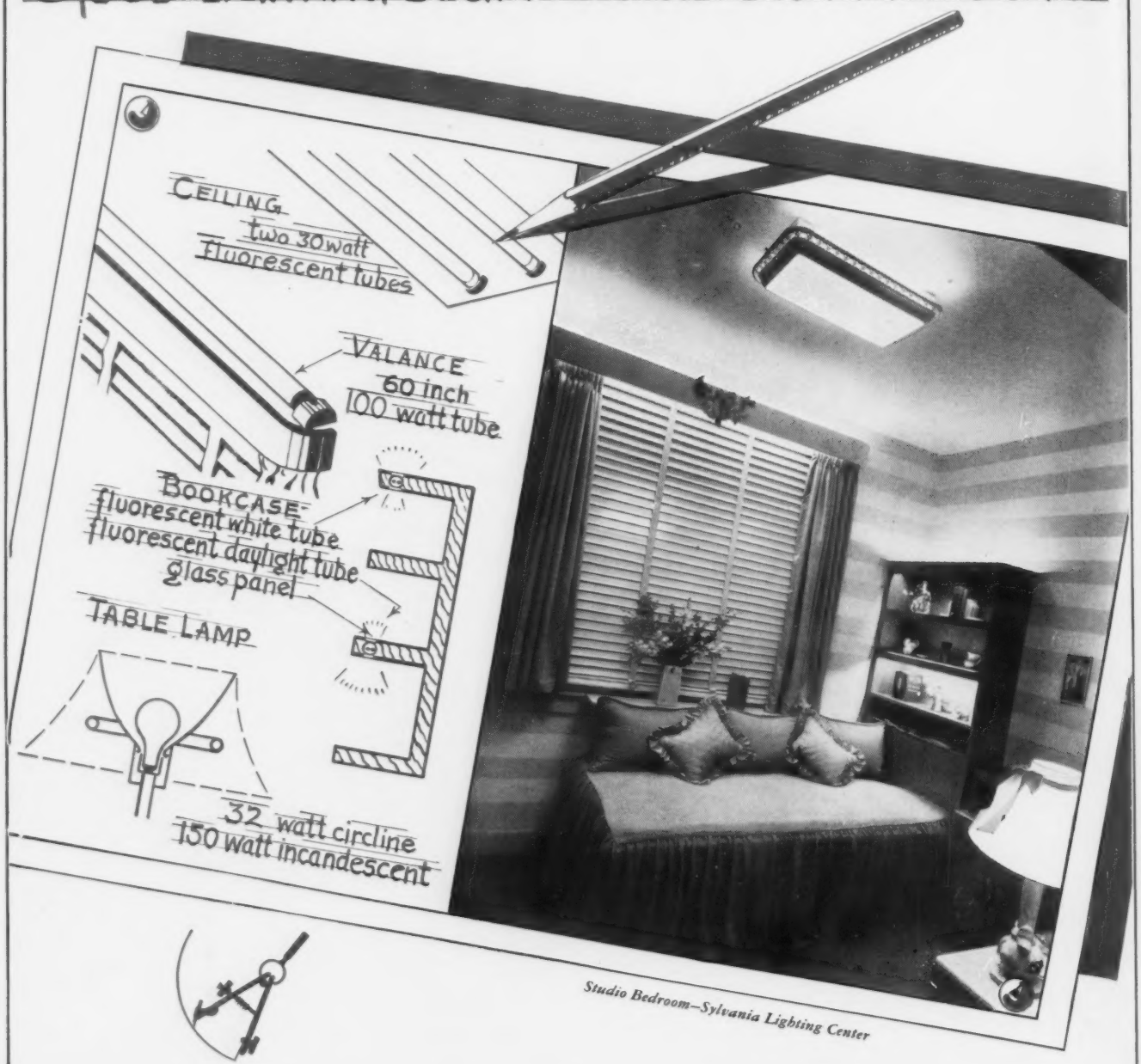
Pacific Gas and Electric Company is cooperating in the development and application of induction and dielectric heating processes in Northern California. Refer your questions about this newest method of industrial heating to our Industrial Power Engineers. They will be glad to help you.

P·G·and E·

EW108-846

PACIFIC GAS AND ELECTRIC COMPANY

Good Lighting Begins on The Drawing Board



Studio Bedroom—Sylvania Lighting Center

Lighting the modern home is much more than putting a lamp here and a lamp there and trusting that the customer will be happy. Good lighting begins on the drawing board with a carefully planned lighting system which not only will give the individual customer ample light when and where he wants it, but will enhance the beauty of the home and furnishings in a pleasing, decorative effect.

Successful lighting manufacturers, contractors and jobbers appreciate the skill and experience which lie behind truly modern installations. New lighting equipment and methods make possible variations in lighting schemes which will fit the purse and delight the heart of every customer. Take the lead in your community . . . *plan* your lighting installations . . . it pays.

PACIFIC COAST ELECTRICAL ASSOCIATION

447 Sutter Street, San Francisco 8 • 601 West Fifth Street, Los Angeles 13